Winnebago Landfill
Northern and Southern Units
Winnebago County, Illinois

Permit Number: 1991-138-LF
Site Number: 2018080001

Alternate Source Demonstration

January 2012

Submitted to:
Illinois Environmental Protection Agency
Bureau of Land
Springfield, Illinois

Prepared for:
Winnebago Landfill
8403 Lindenwood Road
Rockford, Illinois

Prepared by:

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ANDREWS
ENGINEERING, INC.

February 3, 2012

Stephen F. Nightingale
Manager, Permit Section
Bureau of Land
Illinois Environmental Protection Agency
1021 North Grand Ave. East
P.O. Box 19276
Springfield, IL 62794-9276

Re: 2018080001 – Winnebago County
Winnebago Landfill – Northern and Southern Units
Alternate Source Demonstration

Dear Mr. Nightingale:

On behalf of Winnebago Landfill, submitted herein are an original and three copies of an alternate source demonstration in accordance with Condition VIII.15 of Permit No. 1991-138-LF, Modification 53. Application forms (LPC-PA1 and Certification of Authenticity) are provided in Appendix A of the application.

Please contact Tom Hilbert at (815) 963-7516 if you have any questions or require additional information.

Sincerely,

Teresa N. Sharp

Teresa N. Sharp
Environmental Scientist

TNS:bjh:slm

Enclosure(s)

cc: Tom Hilbert – William Charles Waste Companies
Bernie Shorle – US EPA Region 5

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Applications

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1. INTRODUCTION

Condition No. VIII.15 of Permit No. 1991-138-LF, Modification No. 53 requires that an alternate source demonstration be conducted for all confirmed monitored increases detected in facility monitoring wells or that an assessment monitoring program be implemented to determine whether the facility is the source of the increases. Exceedences that were observed during the third quarter of 2011 were sampled for confirmation during the fourth quarter 2011 event. This application provides an alternate source demonstration for the third quarter 2011 confirmed exceedence of dissolved lead at Northern Unit well G52S. The application forms (Certification of Authenticity and LPC-PA1) are contained in Appendix A.

2. BACKGROUND INFORMATION

2.1 Site Description

The Winnebago Landfill facility contains three separate disposal areas (Northern and Southern Units, and the North Expansion Unit) authorized under Illinois EPA Permit Nos. 1991-138-LF and 2006-221-LF, respectively. A site map has been provided as Figure 1. The Northern Unit ceased accepting waste on September 8, 2000. The Southern Unit ceased accepting waste on March 31, 2011. In addition, a North Expansion Unit, located between the existing Northern Unit and Baxter Road, began operation under Illinois Permit No. 2006-221-LF on May 16, 2008. This unit is also shown in Figure 1.

2.2 Site Hydrogeological Summary

The site hydrogeologic characteristics have been accurately determined based on implementation of a series of subsurface investigations, beginning with the initial drilling investigation in 1969 by Testing Engineers, Inc. Subsequent investigations have included advancement of borings, well/piezometer installations for the existing site and facility expansion, and comprehensive groundwater quality testing due to releases by Acme Solvents. Additional hydrogeologic information has been obtained due to development activities of the North Expansion Unit, which includes excavation of materials exposing bedrock and unconsolidated deposits.

2.2.1 Unconsolidated Deposits

The composition of the unconsolidated deposits, which appear to be glacial outwash, varies with location throughout the facility boundaries. Coarse-grained sand and gravel with occasional silt and/or clay seams typically underlie the Northern Unit. The thickness of the sand and gravel varies from just a few feet beneath the east toe of the waste footprint to approximately 70 feet beneath the western edge of the waste boundary. The sand and gravel thickens to the west, corresponding with the erosion of the underlying dolomite. Unconsolidated sand and gravel glacial drift sediments directly underlay the western portion of the Northern Unit, while fractured dolomite bedrock underlies the eastern portion of the landfill.

2.2.2 Bedrock

The bedrock consists of dolomite, fractured and weathered to varying extents. Chert layers, chert nodules, and small vugs were commonly noted on boring logs. However, larger voids or karst characteristics were not indicated on the boring logs. The bedrock surface is highly variable throughout the facility. East of the site a dolomite bedrock upland is present and

outcrops in the vicinity of the Acme Solvent site and two quarries. This bedrock upland represents the eastern bedrock escarpment of the Upper Rock buried valley. The site is situated on the eastern edge of the Upper Rock buried bedrock valley. The overburden thickens as the elevation of the bedrock surface decreases to the west. As determined by previous boring investigations, and monitor well and gas probe installations, the bedrock varies from a high near 750 feet above mean sea level (MSL) at the southeast corner of the North Unit to a low of approximately 675 feet above MSL to the west and south of the South Unit.

2.2.3 Uppermost Aquifer

The uppermost aquifer for the site is located within the glaciofluvial sand and gravel deposits and the upper portion of the fractured dolomite bedrock. The saturated sands and gravels, which directly overlie the bedrock, occur in the western two-thirds of the Northern Unit. In locations where there are no saturated glaciofluvial deposits, the uppermost aquifer is located within the dolomite bedrock typically overlain by silty clay deposits. This occurs in the eastern third of the Northern Unit.

2.2.4 Groundwater Movement

The general direction of movement within the uppermost aquifer is westward in the bedrock upland east of the site. Groundwater movement in the unconsolidated sediments is to the west-northwest. Potentiometric surface maps provided in Appendix B indicate groundwater movement is generally west-northwest beneath the Northern Unit. Groundwater elevations obtained from recent monitor wells and piezometers installed west of Kilbuck Creek indicate movement is to the northwest of Kilbuck Creek. Shallow groundwater may discharge to Kilbuck Creek while groundwater in the lower part of the unconsolidated sediments and deeper bedrock moves beneath Kilbuck Creek.

Kilbuck creek is both a gaining and losing stream dependent upon hydrogeologic and atmospheric conditions. During drier periods where the water table drops below the bottom of the creek bed, surface waters feed the groundwater system. During wetter periods where the water table is high (above the bottom of the creek bed) the groundwater system will recharge the stream and wetlands. This fluctuation allows mixing of surface water (and, therefore, surface water constituents) with groundwater (and any groundwater constituents) often on a seasonal basis. In addition, dependent upon the creek stage, the surface waters of both the creek and the wetland mitigation area may be contiguous.

The aquifer system beneath the facility, which includes both the saturated sand and gravel and the upper weathered/fractured part of the dolomite, extends to an approximate depth of 665 feet MSL. East of the landfill and beneath the eastern quarter of the Northern Unit, the water table occurs within the dolomite bedrock. Beneath the western three-fourths of the site and within the Kilbuck Creek Valley, the water table occurs within the sand and gravel deposits. Previous hydrogeologic investigations and evaluations have shown that vertical gradients do exist within the uppermost aquifer but are typically slight at any individual location. Therefore, groundwater elevations from the bedrock wells and wells screened in the unconsolidated materials (sand and gravel) were used to create one potentiometric surface for each quarterly sampling period. As expected, the hydraulic gradients are greater at the east end of the facility where the bedrock is higher, and flat near Kilbuck Creek.

3. CURRENT GROUNDWATER MONITORING PROGRAM

3.1 Existing Monitor Well Network

The facility has an extensive network of monitoring wells from which groundwater data are obtained. Separate monitor well networks exist for the Northern and Southern Units. The Northern Unit contains 21 groundwater monitoring points, of which five are designated as background groundwater quality wells (upgradient), one is a compliance boundary well at the edge of the zone of attenuation and the remaining wells monitor within the zone of attenuation down- and sidegradient of the landfill. Winnebago Landfill samples 12 additional wells on a quarterly basis as part of the Groundwater Management Zone (GMZ) monitoring network. Each well is identified in Figure 1. The following table provides a list of the monitoring wells for the Northern Unit.

Northern Unit Detection Monitoring Wells (21)	
Upgradient	G09D, G09M, G13S, G13D, G20D
Compliance Boundary	R39S
Zone of Attenuation	G03M, G16M, G17S, G33D, G34D, G35D, G36S
	G37S, G38S, G40S, G41D, G41M, G41S, R42S, G51S
Northern Unit GMZ Only Wells (12)	
Compliance Boundary	G52S, G52M, G54S, G54M
Zone of Attenuation	R03S, G16D, G33S, G34S, G35S, G37D, G130, G50S

The Southern Unit contains 17 permitted groundwater monitoring points. Six are designated as background groundwater quality wells (upgradient); two (G13S and G13D) are also background wells for the Northern Unit. Although, monitoring wells R05S, G29S, and G29D are permitted as zone of attenuation wells, based on the potentiometric surface maps (Appendix B), these wells are also located upgradient to the waste units. The wells have been used previously in the derivation of the background/applicable groundwater quality standards (AGQS) values for the unit. The following table lists the monitoring wells for the Southern Unit.

Southern Unit Detection Monitoring Wells (17)	
Upgradient	R11S, G11D, G13S, G13D, R22S, G22D
Zone of Attenuation	R05S, G23D, R24D, R25D, R27D, R28D, G29S, G29D, G26S, G26D, G49D

3.2 Background Concentrations

The initial background concentrations (AGQSs) for the Northern Unit were determined from data obtained from four wells located east of Lindenwood Road on the Acme Solvent property (B-8, STI-2S, STI-2I, and STI-2D). Background sampling occurred from 1990 through 1992. The AGQSs were proposed in the initial significant modification application and subsequent addenda. Addendum 3 to the initial significant modification, dated February 10, 1993, provided the first full listing of routine AGQS values derived from wells G09M, G09D, G13S, and G13D. Since the time the background concentrations were obtained, remediation at the Acme Solvent facility ceased and an additional quarry began operation north/east of Acme Solvents (the facilities are located upgradient to the landfill). The approximate location of Acme Solvents and

the quarries are shown in Figure 2. These activities have likely affected the current background conditions. To account for changes in the background groundwater quality since 1993, revised AGQS values for 60 G1 and G2 List parameters were submitted and subsequently approved on March 26, 2004 with the issuance of Modification 24 to the current permit.

The initial AGQSs for the Southern Unit were determined from data obtained from the permitted upgradient/background wells. However, revisions to several background values have included data from wells R05S, G29S, and G29D as part of the statistical derivation. Although permitted as zone of attenuation wells, these wells are actually hydraulically upgradient to the Southern Unit and provide additional information on the background groundwater quality. As mentioned in Section 3.1 above, monitoring wells G13S and G13D are contained in the monitoring well networks for both the Northern and Southern Units. The groundwater quality for these two wells along with R05S (Southern Unit) and G16D (Northern Unit) are not evaluated with respect to the permitted AGQSs but are reviewed based on trend analyses in accordance with Condition VIII.25 of Permit No. 1991-138-LF (Modification No. 53).

4. GROUNDWATER QUALITY

In accordance with 35 Illinois Administrative Code (Ill. Adm. Code) 811.319 and the current permit, the groundwater quality is evaluated on a quarterly basis. Results of the statistical evaluations are reported quarterly in accordance with Condition No. VIII.18. Notification of observed /confirmed increases has been submitted in accordance with Condition No. VIII.14 of the permit. As stated in the introduction, this alternate source demonstration will address the third quarter 2011 confirmed exceedence of dissolved lead at Northern Unit well G52S pursuant to Condition VIII.15 of Permit No. 1991-138-LF, Modification No. 53. The historical analytical data for well G52S are provided in Table 1.

The concentration of dissolved lead at well G52S exceeded the interwell AGQS value (4 ug/l) during third quarter 2011 (24 ug/l) and was confirmed fourth quarter 2011 (17 ug/l). Concentrations of dissolved lead have only exceeded the interwell AGQS value at G52S once before, during second quarter 2010. This exceedence was not confirmed. As shown by the graph in Appendix C, the overall trend for dissolved lead at G52S is sporadic, with no clear increasing or decreasing trend. In addition, trends for the remaining List G1 parameters are largely stable. The List G1 parameters (Appendix C), often referred to as indicator parameters, are those generally present in leachate with higher concentrations than in groundwater and are least attenuative, and therefore are expected to provide early detection of a release from a waste unit. Historically, there have been no confirmed exceedences of any other List G1 indicator parameters at G52S. Also, there have been no organic detections observed at G52S, with the exception of phenolics during second quarter 2010 (17 ug/L). The second quarter 2010 detection of phenolics was not confirmed. The anomalous detection of phenolics was addressed and approved as part of Application Log No. 2010-373 (Modification No. 51).

There have also been no confirmed exceedences of dissolved lead at any other Northern Unit well. A facility-related impact to the groundwater is typically characterized by concentration increases of multiple parameters. The lack of increasing trends, the lack of lead exceedences at any other Northern Unit well, and the lack of exceedences of highly mobile parameters (such as organic compounds or inorganic indicator parameters) strongly indicates that the exceedences at G52S are the result of natural spatial variability for this parameter. In addition, the fourth quarter 2011 concentration of total lead at L318 (7.4 ug/l), is lower than the concentration observed

at G52S (17 ug/l). The lower concentration observed in leachate provides further evidence that the exceedences of dissolved lead observed at G52S are not due to a landfill impact.

Additionally, groundwater movement at G52S has been to the north since its installation. The characteristics of the groundwater movement at G52S was evaluated and discussed in detail as part of Application Log No. 2011-197. A comprehensive hydrogeologic investigation was conducted west and northwest of the Southern and Northern Units as part of the facility expansion (Illinois EPA Log Nos. 2006-221 and 2010-221). A series of piezometers were installed in the area identified as the Western Expansion Unit. This area is located south of Northern Unit Compliance Boundary wells G52S and G52M and Temporary Investigation wells T1U-A, T1L-A, T2U-A, T2L-A, T3U-A, and T3L-A. The evaluation concluded that wells G52S and G52M and the temporary Investigation maintain a consistent gradient and flow direction (northward). Well G52S accesses groundwater moving from the south to north.

5. RECOMMENDATIONS AND CONCLUSIONS

Based on an evaluation of the historic sampling results and trend analyses, the confirmed increase of dissolved lead at G52S is not associated with the landfill but appears to be related to temporal/spatial variability. To account for the spatial variability observed, an intrawell value (98.87 ug/L) is proposed for dissolved lead at G52S. The statistical method utilized is provided in Appendix D, along with the statistical calculations in Appendix E. This alternate source demonstration fulfills the requirements of Condition No. VIII.15 of Permit No. 1991-138-LF Modification No 53.

TABLES

Table 1
Winnebago Landfill
G52S Historical Analytical

Well ID	Parameter	Units	GW List	AGQS	4thQtr09	1stQtr10	2ndQtr10	3rdQtr10	4thQtr10	1stQtr11	2ndQtr11	3rdQtr11	4thQtr11
G52S	Ammonia as N, dissolved	mg/l	G1	0.9	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.1	< 0.1	< 0.1
G52S	Arsenic, Dissolved	ug/l	G1	2	1.1	< 1	3.4	1.2	1.1	< 1	< 1	2	3
G52S	Boron, Dissolved	ug/l	G1	98	41	62	65	68	59	70	65	28	68
G52S	Cadmium, Dissolved	ug/l	G1	5	< 1	< 1	< 1	< 1	1	< 1	< 1	< 1	< 1
G52S	Chloride, Dissolved	mg/l	G1	87.511	65	75	52	53	45	41	42	38	41
G52S	Chromium, dissolved	ug/l	G1	72	< 4	< 4	23	4.7	< 4	< 4	< 4	22	6.4
G52S	Cyanide, Total	mg/l	G1	0.34	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
G52S	Lead, Dissolved	ug/l	G1	4	< 1	< 1	53	3	1.2	< 1	< 1	24	17
G52S	Magnesium, dissolved	mg/l	G1	170.41	51	52	260	61	48	53	44	110	200
G52S	Mercury, dissolved	ug/l	G1	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
G52S	Nitrate as N, dissolved	mg/l	G1	11.74	2.3	6.5	2.8	4	5.2	6.1	5.6	5.9	5.6
G52S	pH (field)	units	G1	5.4 - 8.1	7.91	7.19	7.42	7.67	6.56	7.22	7.63	6.9	8.41
G52S	Specific Conductance (field)	umhos	G1	2386.55	546	527	830	1983	842	923	612	676	640
G52S	Sulfate, Dissolved	mg/l	G1	360	48	33	32	32	31	33	31	32	34
G52S	Total Dissolved Solids, filtered	mg/l	G1	4200	550	570	480	590	450	460	430	450	400
G52S	Zinc, Dissolved	ug/l	G1	236072.4	34	< 6	150	19	< 6	8	< 6	86	37
G52S	1,1,1,2-Tetrachloroethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,1,1-Trichloroethane	ug/l	G2	12	< 1		< 1		< 1		< 1		< 1
G52S	1,1,2,2-Tetrachloroethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,1,2-Trichloroethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,1-Dichloroethane	ug/l	G2	31	< 1		< 1		< 1		< 1		< 1
G52S	1,1-Dichloroethene	ug/l	G2	2.5	< 1		< 1		< 1		< 1		< 1
G52S	1,1-Dichloropropene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2,3-Trichlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2,3-Trichloropropane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2,4-Trichlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2,4-Trimethylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2-Dibromo-3-chloropropane	ug/l	G2	5	< 0.05		< 0.05		< 0.05		< 0.2		< 0.2
G52S	1,2-Dibromoethane (EDB)	ug/l	G2	5	< 0.05		< 0.05		< 0.05		< 0.05		< 0.05
G52S	1,2-Dichlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,2-Dichloroethane	ug/l	G2	2.5	< 1		< 1		< 1		< 5		< 1
G52S	1,2-Dichloropropane	ug/l	G2	6	< 1		< 1		< 1		< 1		< 1
G52S	1,3,5-Trimethylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,3-Dichlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,3-Dichloropropane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,3-Dichloropropene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	1,4-Dichlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	2,2-Dichloropropane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	2-Butanone (MEK)	ug/l	G2	5	< 5		< 5		< 5		< 5		< 5
G52S	2-Chlorotoluene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	2-Hexanone (MBK)	ug/l	G2	10	< 1		< 1		< 1		< 1		< 1
G52S	4-Chlorotoluene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	4-Methyl-2-pentanone (MIBK)	ug/l	G2	10	< 5		< 5		< 5		< 5		< 5

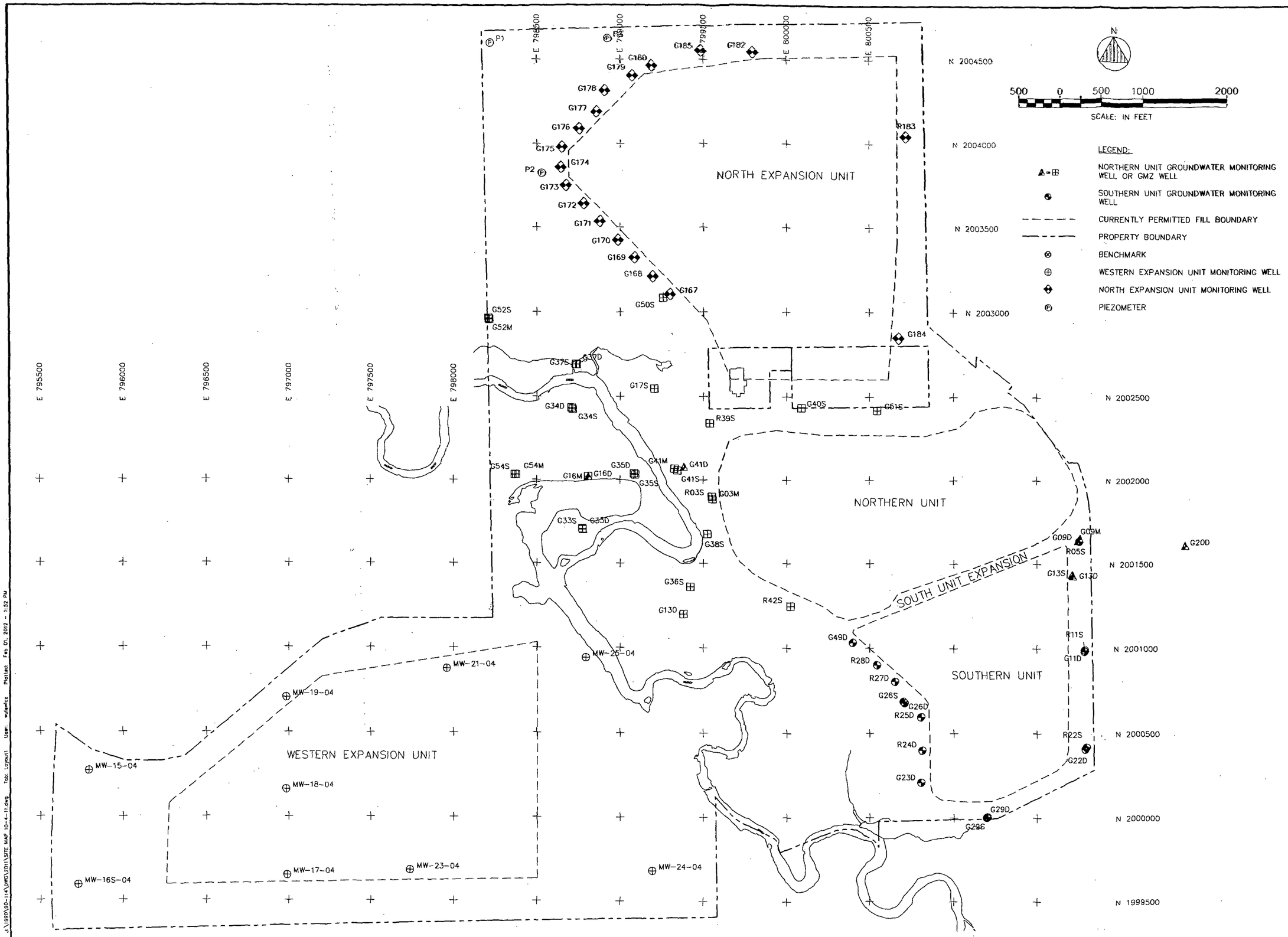
Note: A highlighted cell indicates an exceedence of the Interwell AGQS value.
Andrews Engineering, Inc.

Table 1
Winnebago Landfill
G52S Historical Analytical

Well ID	Parameter	Units	GW List	AGQS	4thQtr09	1stQtr10	2ndQtr10	3rdQtr10	4thQtr10	1stQtr11	2ndQtr11	3rdQtr11	4thQtr11
G52S	Acetone	ug/l	G2	10	< 5		< 5		< 5		< 5		< 5
G52S	Acrylonitrile	ug/l	G2	10	< 5		< 5		< 5		< 5		< 5
G52S	Benzene	ug/l	G2	2.8	< 1		< 1		< 1		< 1		< 1
G52S	Bromobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Bromochloromethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Bromodichloromethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Bromoform	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Bromomethane	ug/l	G2	10	< 2		< 2		< 2		< 2		< 2
G52S	Carbon disulfide	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Carbon tetrachloride	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Chlorobenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Chloroethane	ug/l	G2	10	< 2		< 2		< 2		< 2		< 2
G52S	Chloroform	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Chloromethane	ug/l	G2	10	< 2		< 2		< 2		< 2		< 2
G52S	cis-1,2-Dichloroethene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	cis-1,3-Dichloropropene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Dibromochloromethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Dibromomethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Dichlorodifluoromethane	ug/l	G2	19	< 1		< 1		< 1		< 1		< 1
G52S	Ethylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Hexachlorobutadiene	ug/l	G2	100	< 2		< 2		< 2		< 2		< 2
G52S	Iodomethane	ug/l	G2	10	< 1		< 1		< 1		< 1		< 1
G52S	Isopropylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Methylene Chloride	ug/l	G2	8	< 2.5		< 2.5		< 2.5		< 2		< 2
G52S	Naphthalene	ug/l	G2	100	< 5		< 5		< 5		< 5		< 5
G52S	n-Butylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	n-Propylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Oil (Hexane Soluble)	mg/l	G2	2.5	< 5		< 5		< 5		< 5		< 6
G52S	Phenolics	ug/l	G2	100	< 5		17		< 5		< 5		< 5
G52S	p-Isopropyltoluene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	sec-Butylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Styrene	ug/l	G2	10	< 1		< 1		< 1		< 1		< 1
G52S	tert-Butylbenzene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Tetrachloroethene	ug/l	G2	26	< 1		< 1		< 1		< 1		< 1
G52S	Tetrahydrofuran	ug/l	G2	42	< 2.5		< 2.5		< 2.5		< 2		< 2
G52S	Toluene	ug/l	G2	20	< 1		< 1		< 1		< 1		< 1
G52S	trans-1,2-Dichloroethene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	trans-1,3-Dichloropropene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	trans-1,4-Dichloro-2-butene	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Trichloroethene	ug/l	G2	66	< 1		< 1		< 1		< 1		< 1
G52S	Trichlorofluoromethane	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1
G52S	Vinyl acetate	ug/l	G2	10	< 1		< 1		< 1		< 1		< 1
G52S	Vinyl chloride	ug/l	G2	17	< 2		< 2		< 2		< 2		< 2
G52S	Xylenes (Total)	ug/l	G2	5	< 1		< 1		< 1		< 1		< 1

Note: A highlighted cell indicates an exceedence of the Interwell AGQS value.
Andrews Engineering, Inc.

FIGURES



NO.	DATE	REVISIONS DESCRIPTION	BY

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APPROVED BY: JLR | DESIGNED BY: JLR | DRAWN BY: MPH

SITE MAP

PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: OCTOBER 2011
PROJECT ID: 1990-114
SHEET NUMBER:

FIG 1

E. 798,500 E. 799,000 E. 799,500 E. 800,000 E. 800,500 E. 801,000 E. 801,500 E. 802,000 E. 802,500 E. 803,000 E. 803,500

N. 2,004,000

N. 2,003,500

N. 2,003,000

N. 2,002,500

NORTH EXPANSION UNIT
(CONSTRUCTION ONGOING)

QUARRY OPERATIONS

BOUNDARIES SHOWN ARE APPROXIMATE

ACME SOLVENTS

NORTHERN UNIT

SOUTHERN UNIT EXPANSION

SOUTHERN UNIT

LEGEND

CURRENTLY PERMITTED FILL BOUNDARY

NOTE:
AERIAL PHOTOGRAPHY TAKEN ON DECEMBER 16, 2011 BY AERO-METRIC, INC.

N

250 0 250 500 1000

SCALE: IN FEET

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1	5/11/10	ADDED COORDINATE SYSTEM GRID	KEV

ANDREWS ENGINEERING, INC.
3300 Gregor Creek Drive, Springfield, IL 62711-7233
Tel (217) 787-2334 Fax (217) 787-9495
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO

DESIGNED BY: TNS | DRAWN BY: MPN | CHECKED BY: TNS | APPROVED BY:

SITE LOCATION MAP

PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: FEBRUARY 2012

PROJECT ID: 90-114

SHEET NUMBER: FIG. 2

File: J:\1990\90-114\DWG\North Expansion Unit\FIG1.DGN Tab: Layout1 (2) User: wulewicz Plotted: Feb 01, 2012 - 1:47 PM

APPENDIX A

APPLICATION FORMS

Illinois Environmental Protection Agency

Bureau of Land • 1021 N. Grand Avenue E. • Box 19276 • Springfield • Illinois • 62794-9276

General Application for Permit
(LPC - PA1)

This form must be used for any application for permit, except for landscape waste composting or hazardous waste management facilities regulated in accordance with RCRA, Subtitle C from the Bureau of Land. One original, and two copies, or three if applicable, of all permit application forms must be submitted. Attach the original and appropriate number of copies of any necessary plans, specifications, reports, etc. to fully support and describe the activities and modifications being proposed. Attach sufficient information to demonstrate the compliance with all regulatory requirements. Incomplete applications will be rejected.

Niote: Permit applications which are hand-deliverd to the Bureau of Land, Permit Section must be delivered to the above address between 8:30 am and 5:00 pm, Monday through Friday (excluding State holidays).

NOTE: Please complete this form online, save a copy locally, print and submit it to the Permit Section #33, at the above address.

I. Site Identification:

Site Name: Winnebago Landfill IEPA ID Number: 2018080001

Street Address: 8403 Lindenwood Road P.O. Box: _____

City: Rockford State: IL Zip Code: 61109 County: Winnebago

Existing DE/OP Permit Numbers (if applicable): 1991-138-LF _____ _____

2. Owner/Operator Identification:

Owner		Operator	
Name:	Winnebago Landfill Company, LLC	Name:	Winnebago Reclamation Service, Inc.
Street Address:	5450 Wansford Way, Suite 201B	Street Address:	5450 Wansford Way, Suite 201B
PO Box:		PO Box:	
City:	Rockford State: IL	City:	Rockford State: IL
Zip Code:	61109 Phone:	Zip Code:	61109 Phone:
Contact:	Tom Hilbert	Contact:	Tom Hilbert
Email Address:	thilbert@rresvcs.com	Email Address:	thilbert@rresvcs.com

TYPE OF SUBMISSION/REVIEW PERIOD:

- ☐ New Landfill/180 days (35 IAC Part 813)
- ☐ Landfill Expansion/180 days (35 IAC Part 813)
- ☐ Sig. Mod. to Operate/90 days (35 IAC Part 813)
- ☑ Other Sig. Mod./90 days (35 IAC Part 813)
- ☐ Renewal of Landfill/90 days (35 IAC Part 813)
- ☐ Developmental/90 days (35 IAC Part 807)
- ☐ Operating/45 days (35 IAC Part 807)
- ☐ Supplemental/90 days (35 IAC Part 807)
- ☐ Permit Transfer/90 days (35 IAC Part 807)
- ☐ Renewal of Experimental Permit (35 IAC Part 807)

TYPE OF FACILITY:

- ☑ Landfill
- ☐ Land Treatment
- ☐ Transfer Station
- ☐ Treatment Facility
- ☐ Storage
- ☐ Incinerator
- ☐ Composting
- ☐ Recycling/Reclamation
- ☐ Other (Specify)

TYPE OF WASTE:

- ☑ General Municipal Refuse
- ☐ Hazardous
- ☑ Special (Non-Hazardous)
- ☐ Chemical Only (exec. putrescible)
- ☐ Inert Only (exec. chem. & putrescible)
- ☐ Used Oil
- ☐ Potentially Infectious Medical Waste
- ☐ Landscape/Yard Waste
- ☐ Other (Specify)

3. Description of this Permit Request:

Alternate source demonstration for the third quarter 2011 confirmed exceedence of dissolved lead at Northern Unit well G52S, in accordance with Permit Condition VIII.15 (Modification No. 53).

4. Completeness Requirements

The following items must be checked Yes, No or N/A. Each item will be reviewed for completeness by the log clerk. Blank items will result in rejection of the application. Please refer to the instructions for further guidance.

1. Have all required public notice letters been mailed in accordance with the LPC-PA16 instructions? ☑ Yes ☐ No ☐ N/A

   (If so, provide a list of those recipients of the required public notice letters for Illinois EPA retention. Such retention shall not imply any Illinois EPA review and/or confirmation of the list.)

Public Notice Recipients

Name: Dave Syverson Title: Senator - District 34
Street Address: 200 South Wyman Street, Suite 302 P.O. Box:
City: Rockford State: IL Zip Code: 61101 Phone:

Name: Charles Jefferson Title: Representative - District 67
Street Address: 200 South Wyman Street, Suite 304 P.O. Box:
City: Rockford State: IL Zip Code: 61101 Phone:

Name: Joseph Bruscato Title: State's Attorney
Street Address: 400 West State Street P.O. Box:
City: Rockford State: IL Zip Code: 61101 Phone:

Name: Scott Christiansen Title: County Chairman
Street Address: 404 Elm Street, Room 504 P.O. Box:
City: Rockford State: IL Zip Code: 61101 Phone:

Name: Village of New Milford Title: Village Clerk
Street Address: 6771 11th Street P.O. Box:
City: Rockford State: IL Zip Code: 61109 Phone:

Name: Village of Davis Junction Title: Village Clerk
Street Address: 106 North Elm Street P.O. Box: 207
City: Davis Junction State: IL Zip Code: 61020 Phone:

Name: Cherry Valley Township Title:
Street Address: 4875 Blackhawk Road P.O. Box:
City: Rockford State: IL Zip Code: 61109 Phone:

2. a. Is the Siting Certification Form (LPC-PA8) completed and enclosed? ☐ Yes ☑ No ☐ N/A

   b. Is siting approval currently under litigation? ☐ Yes ☑ No ☐ N/A

3. a. Is a closure, and if necessary a post-closure plan covering these activities being submitted, or ☐ Yes ☑ No ☐ N/A

   b. has one already been approved? If yes, provide the permit number: 1991-138-LF

4. a. For waste disposal sites, only: Has any employee, owner, operator, officer or director of the owner or operator had a prior conduct certification denied, canceled or revoked? ☐ Yes ☑ No ☐ N/A

   b. Have you included a demonstration of how you comply or intend to comply with 35 Ill. Adm. Code 745? ☐ Yes ☐ No ☑ N/A

5. a. Is land ownership held in beneficial trust? ☐ Yes ☑ No ☐ N/A

   b. If yes, is a beneficial trust certification form (LPC-PA9) completed and enclosed? ☐ Yes ☐ No ☑ N/A

6. a. Does the application contain information or proposals regarding the hydrogeology; groundwater monitoring, modeling or classification; a groundwater impact assessment; or vadose zone monitoring for which you are requesting approval? ☑ Yes ☐ No ☐ N/A

   b. If yes, have you submitted a third copy of the application (4 total) and supporting documents? ☑ Yes ☐ No ☐ N/A

5. Signatures:

Original signatures are required. Signature stamps or applications transmitted electronically or by FAX are not acceptable.

All applications shall be signed by the person designated below as a duly authorized representative of the owner an/or operator.

Corporation - By a principal executive officer of the level of vice-president or above.
Partnership or Sole Proprietorship - By a general partner or the proprietor, respectively.
Government - By either a principal executive officer or a ranking elected official.

A person is a duly authorized representative of the owner and operator only if:

1. They meet the criteria above or the authorization has been granted in writing by a person described above; and
2. Is submitted with this application (a copy of a previously submitted authorization can be used).

I hereby affirm that all information contained in this application is true and accurate to the best of my knowledge and belief. I do herein swear that I am a duly authorized representative of the owner/operator and I am authorized to sign this permit application form.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Owner Signature: _____ Date: 1-30-2012

Printed Name: Thomas Hilbert Title: Engineering Manager

Notary: Subscribed and Sworn before me this _____ day of _____ 20___ .

My commission expires on: _____

Signature & Stamp/Seal of Notary Public

Operator Signature: _____ Date: 1-30-2012

Printed Name: Thomas Hilbert Title: Engineering Manager

Notary: Subscribed and Sworn before me this 30th day of January 20 12

My commission expires on: 1/10/2014 Nicole K. DeBoer

Signature & Stamp/Seal of Notary Public

"OFFICIAL SEAL"
Nicole K. DeBoer
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 1/10/2014

Engineer's Name: Jeremy C. Poetzscher Engineer's Title: Project Engineer

Company: Andrews Engineering, Inc. Registration Number: 062-061274

Street Address: 3300 Ginger Creek Drive PO Box: _____

City: Springfield State: IL Zip Code: 62711 Phone: 217-788-2450

Email Address: jpoetzscher@andrews-eng.com License Expiration Date: 11/30/2013

Signature: _____ Date: 2/1/2012

Professional Engineer's Seal:

JEREMY C. POETZSCHER
062.061274
LICENSED PROFESSIONAL ENGINEER OF ILLINOIS

APPENDIX B

Potentiometric Surface Maps

E 795,500 E 796,000 E 796,500 E 797,000 E 797,500 E 798,000 E 798,500 E 799,000 E 799,500 E 800,000 E 800,500 E 801,000 E 801,500 E 802,000

N 2,005,000 N 2,004,500 N 2,004,000 N 2,003,500 N 2,003,000 N 2,002,500 N 2,002,000 N 2,001,500 N 2,001,000 N 2,000,500 N 2,000,000 N 1,999,500

LEGEND

- SGX — STREAM GAUGE LOCATION
- NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
- SOUTHERN UNIT GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- CURRENTLY PERMITTED FILL BOUNDARY
- GRADIENT LINE
- PIEZOMETER
- NORTH EXPANSION UNIT MONITORING WELL
- TEMPORARY GMZ ASSESSMENT WELL
- WESTERN EXPANSION UNIT MONITORING WELL

WINNEBAGO RECLAMATION LANDFILL PROPERTY BOUNDARY

NORTH EXPANSION UNIT

NORTHERN UNIT

SOUTHERN UNIT

WESTERN EXPANSION UNIT

SOUTH UNIT EXPANSION

QUARRY OPERATIONS

EASTERN LIMITS OF QUARRY AND ACME SOLVENTS EXTEND BEYOND THIS POINT

BOUNDARIES SHOWN ARE APPROXIMATE

ACME SOLVENTS

KILLBUCK CREEK

WETLAND MITIGATION AREA

COMMONWEALTH EDISON R.O.W.

LINDENWOOD ROAD

I-251

699 704 709 714

P1 698.11 P2 695.43 P3 698.99

G185 689.65 G182 698.95 G179 695.49 G180 695.80 G178 695.51 G177 691.06 G176 695.20 G175 695.29 G174 693.95 G173 693.63 G172 691.66 G171 693.30 G170 692.94 G169 693.60 G168 693.64 G119 NA G167 692.21 G50S DRY G52S 699.44 G52M 699.42 G18D 696.31 G18S DRY G184 697.07 G175 DRY G40S DRY G51S 697.72 R39S 698.82 R18S 694.93

T3L-A 702.89 T3U-A 704.73 G37S 705.99 G37D 703.08 T2L-A 703.15 T2U-A 702.75 G34D 702.54 G34S 704.79 T1L-A 703.30 T1U-A 703.30 G16M 703.01 G16D 703.17 G35D 703.16 G35S 703.07 G41M 703.29 G41D 702.99 G41S 703.24 R03S 703.41 G03M 703.41 G33S 705.49 G33D 705.12 G38S 704.22 G36S 706.75 G130 706.99 R42S 708.32

G09D 718.45 G09M 718.23 R05S 718.63 G20D 719.68 G13S 718.02 G13D 717.50 R11S 715.98 G11D 715.91 G49D 709.63 R28D NA R27D 710.33 G26S 710.70 G26D 710.63 R25D 711.38 R24D *706.08 R22S *727.99 G22D 716.79 G23D 713.07 G29D 715.12 G29S 713.48

MW-21 708.20 MW-25 712.76 MW-19 708.96 MW-15 709.38 MW-18 709.96 MW-17 710.96 MW-23 710.71 MW-16S 710.64 MW-16D 710.20

NOTES

1. CONTOUR INTERVAL = 5 FEET
2. SAMPLE DATES = 1/17/2011 - 1/20/2011.
3. (*) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
5. IN THE CASE OF NESTED WELLS THE GROUNDWATER ELEVATIONS FROM SHALLOW WELLS WERE USED IN THE COMPILATION OF POTENTIOMETRIC CONTOURS.
6. POTENTIOMETRIC CONTOURS AS SHOWN ASSUME CONTINUOUS GEOLOGICAL CONDITIONS AND DO NOT ACCOUNT FOR LINER AND SIDEWALLS EMPLACED FOR DEVELOPMENT OF THE NORTH EXPANSION UNIT.

N

300 0 300 600 1200

SCALE: IN FEET

NO.	DATE	REVISIONS DESCRIPTION	BY

ANDREWS ENGINEERING, INC.
3300 Ginger Creek Drive, Springfield, IL 62711-7233
Tel (217) 787-2334 Fax (217) 787-9495
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO

APPROVED BY: JLR | DESIGNED BY: JLR | DRAWN BY: MPN

POTENTIOMETRIC SURFACE MAP
1ST QUARTER 2011

PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: FEBRUARY 2010
PROJECT ID: 90-114
SHEET NUMBER: 1011

E 795,500 E 796,000 E 796,500 E 797,000 E 797,500 E 798,000 E 798,500 E 799,000 E 799,500 E 800,000 E 800,500 E 801,000 E 801,500 E 802,000

N 2,005,000 N 2,004,500 N 2,004,000 N 2,003,500 N 2,003,000 N 2,002,500 N 2,002,000 N 2,001,500 N 2,001,000 N 2,000,500 N 2,000,000 N 1,999,500

LEGEND

- SGX — STREAM GAUGE LOCATION
- NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
- SOUTHERN UNIT GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- CURRENTLY PERMITTED FILL BOUNDARY
- GRADIENT LINE
- P — PIEZOMETER
- NORTH EXPANSION UNIT MONITORING WELL
- TEMPORARY GMZ ASSESSMENT WELL
- WESTERN EXPANSION UNIT MONITORING WELL

WINNEBAGO RECLAMATION LANDFILL PROPERTY BOUNDARY

NORTH EXPANSION UNIT

WESTERN EXPANSION UNIT

NORTHERN UNIT

SOUTHERN UNIT

QUARRY OPERATIONS

ACME SOLVENTS

KILLBUCK CREEK

WETLAND MITIGATION AREA

SOUTH UNIT EXPANSION

EASTERN LIMITS OF QUARRY AND ACME SOLVENTS EXTEND BEYOND THIS POINT

BOUNDARIES SHOWN ARE APPROXIMATE

I-251

LINDENWOOD ROAD

693 698 703 708 713 718

P1 698.40 P3 698.32 P2 692.66

G185 694.75 G182 694.48 G179 695.58 G180 695.35 G176 694.73 G177 693.82 G176 693.47 G175 692.51 G174 689.60 G173 689.86 G172 690.73 G171 692.77 G170 692.94 G169 693.64 G168 693.70 G167 692.51 G50S 696.61 R183 694.34 G184 696.67 G18D 695.91 G18S 701.39 G40S 701.61 G51S 697.37 R39S 698.67 G52S 699.61 G52M 699.54 T3L-A NA T3U-A NA G37S 706.10 G37D 702.74 G17S 701.62 T2L-A NA T2U-A NA G34D 703.34 G34S 704.38 T1L-A NA T1U-A NA G16M 704.09 G16D 704.15 G35D 704.04 G35S 704.00 G41M 704.09 G41D 704.15 G41S 704.15 R03S 704.23 G03M 704.23 G33S 706.32 G33D 705.92 G38S 705.20 G36S 707.50 G130 707.83 R42S 709.24 G49D 710.37 R28D 728.10 R27D 711.08 G26S 711.47 G26D 711.38 R25D 712.38 R24D 712.86 R23D 713.84 G29D 715.91 G29S 714.35 G09D 720.73 G09M 714.38 R05S 720.64 G13S 720.12 G13D 719.44 G20D 721.76 R11S 717.08 G11D 717.30 R22S 729.78 G22D 717.63

MW-21-04 NA MW-19-04 NA MW-15-04 NA MW-18-04 NA MW-17-04 NA MW-23-04 NA MW-16S-04 NA MW-16D-04 NA MW-25-04 NA

NOTES:

1. CONTOUR INTERVAL = 5 FEET
2. SAMPLE DATES = 4/6/2011 – 4/8/2011.
3. (•) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
5. IN THE CASE OF NESTED WELLS THE GROUNDWATER ELEVATIONS FROM SHALLOW WELLS WERE USED IN THE COMPILATION OF POTENTIOMETRIC CONTOURS.
6. POTENTIOMETRIC CONTOURS AS SHOWN ASSUME CONTINUOUS GEOLOGICAL CONDITIONS AND DO NOT ACCOUNT FOR LINER AND SIDEWALLS EMPLACED FOR DEVELOPMENT OF THE NORTH EXPANSION UNIT.

N

300 0 300 600 1200

SCALE: IN FEET

NO.	DATE	REVISIONS DESCRIPTION	BY

ANDREWS ENGINEERING, INC.
3300 Ginger Creek Drive, Springfield, IL 62711-7233
Tel (217) 787-2334 Fax (217) 787-9495
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO

APPROVED BY: JLR DESIGNED BY: DRAWN BY: MPN

POTENTIOMETRIC SURFACE MAP
2ND QUARTER 2011

PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: JULY 2011
PROJECT ID: 90-114
SHEET NUMBER: 2Q11

E 795,500 E 796,000 E 796,500 E 797,000 E 797,500 E 798,000 E 798,500 E 799,000 E 799,500 E 800,000 E 800,500 E 801,000 E 801,500 E 802,000

N 2,005,000 N 2,004,500 N 2,004,000 N 2,003,500 N 2,003,000 N 2,002,500 N 2,002,000 N 2,001,500 N 2,001,000 N 2,000,500 N 2,000,000 N 1,999,500

LEGEND

- SGX — STREAM GAUGE LOCATION
- NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
- SOUTHERN UNIT GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- CURRENTLY PERMITTED FILL BOUNDARY
- GRADIENT LINE
- PIEZOMETER
- NORTH EXPANSION UNIT MONITORING WELL
- WESTERN EXPANSION UNIT MONITORING WELL

WINNEBAGO RECLAMATION LANDFILL PROPERTY BOUNDARY

NORTH EXPANSION UNIT

NORTHERN UNIT

SOUTHERN UNIT

WESTERN EXPANSION UNIT

QUARRY OPERATIONS

ACME SOLVENTS

BOUNDARIES SHOWN ARE APPROXIMATE

EASTERN LIMITS OF QUARRY AND ACME SOLVENTS EXTEND BEYOND THIS POINT

SOUTH UNIT EXPANSION

KILLBUCK CREEK

WETLAND MITIGATION AREA

LINDENWOOD ROAD

I-251

P1 699.21
P3 699.24
P2 692.98

G185 695.1
G182 695.31
G179 696.15
G180 696.12
G178 695.39
G177 694.38
G176 693.85
G175 692.84
G174 691.02
G173 690.27
G172 691.13
G171 693.42
G170 693.21
G169 693.77
G168 693.82
G167 692.50
G50S dry
G52S 699.82
G52M 699.74
G37S no access
G37D no access
G17S dry
G34D 702.77
G34S 704.04
G54S G54M
G16M 703.32
G16D 704.51
G35D 703.46
G35S 703.40
G41M 704.14
G41D 704.03
G41S 704.52
R03S 723.65
G03M 703.68
G33S 705.79
G33D 705.34
G38S 704.52
G36S 706.89
G130 707.02
R42S 708.47
R183 695.21
G184 696.67
G40S dry
G51S 697.21
R39S 698.33
G09D 721.24
G09M 720.83
R05S 721.98
G20D 721.96
G13S 719.09
G13D 718.69
G49D 709.76
R20D damaged
R27D
G26S 710.84
G26D 710.75
R25D 711.73
R24D 712.24
G23D 713.15
R11S 716.87
G11D 717.09
R22S 727.82
G22D 717.44
G29D 715.44
G29S 713.28
MW-21-04 NA
MW-19-04 NA
MW-25-04 NA
MW-15-04 NA
MW-18-04 NA
MW-17-04 NA
MW-23-04 NA
MW-16S-04 NA
MW-16D-04 NA

695 700 705 710 715

NOTES:

1. CONTOUR INTERVAL = 5 FEET
2. SAMPLE DATES = 7/15/2011 – 7/18/2011.
3. (*) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
5. IN THE CASE OF NESTED WELLS THE GROUNDWATER ELEVATIONS FROM SHALLOW WELLS WERE USED IN THE COMPILATION OF POTENTIOMETRIC CONTOURS.
6. POTENTIOMETRIC CONTOURS AS SHOWN ASSUME CONTINUOUS GEOLOGICAL CONDITIONS AND DO NOT ACCOUNT FOR LINER AND SIDEWALLS EMPLACED FOR DEVELOPMENT OF THE NORTH EXPANSION UNIT.

N

300 0 300 600 1200

SCALE: IN FEET

NO	DATE	REVISIONS DESCRIPTION	BY

ANDREWS ENGINEERING, INC.
3300 Ginger Creek Drive, Springfield, IL 62711-7233
Tel (217) 787-2334 Fax (217) 787-9495
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO

APPROVED BY: JLR | DESIGNED BY: | DRAWN BY: MPN

POTENTIOMETRIC SURFACE MAP
3RD QUARTER 2011

PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: JULY 2011
PROJECT ID: 90-114
SHEET NUMBER: 3011

E 795.500 E 796.000 E 796.500 E 797.000 E 797.500 E 798.000 E 798.500 E 799.000 E 799.500 E 800.000 E 800.500 E 801.000 E 801.500 E 802.000

N 2,005,000 N 2,004,500 N 2,004,000 N 2,003,500 N 2,003,000 N 2,002,500 N 2,002,000 N 2,001,500 N 2,001,000 N 2,000,500 N 2,000,000 N 1,999,500

LEGEND

- SGX — STREAM GAUGE LOCATION
- NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
- SOUTHERN UNIT GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- CURRENTLY PERMITTED FILL BOUNDARY
- GRADIENT LINE
- PIEZOMETER
- NORTH EXPANSION UNIT MONITORING WELL
- WESTERN EXPANSION UNIT MONITORING WELL

WINNEBAGO RECLAMATION LANDFILL PROPERTY BOUNDARY

NORTH EXPANSION UNIT

WESTERN EXPANSION UNIT

NORTHERN UNIT

SOUTHERN UNIT

SOUTH UNIT EXPANSION

QUARRY OPERATIONS

EASTERN LIMITS OF QUARRY AND ACME SOLVENTS EXTEND BEYOND THIS POINT

BOUNDARIES SHOWN ARE APPROXIMATE

ACME SOLVENTS

KILLBUCK CREEK

WETLAND MITIGATION AREA

LINDENWOOD ROAD

I-251

695 690 700 705 710 715 720

P1 697.71 P2 697.70 P3 700.32

G185 695.30 G182 695.13 G180 696.88 G179 696.99 G178 696.96 G177 697.18 G176 697.55 G175 697.63 G174 697.52 G173 697.57 G172 697.46 G171 697.76 G170 694.48 G169 693.64 G168 693.59 G167 690.09 G50S dry G52S 700.53 G52M 700.50 G37S 706.10 G37D 702.74 G17S dry G34D 701.80 G34S 703.97 G40S dry G51S dry R39S damaged R183 693.87 G184 689.79

G54S G54M G16M 702.19 G16D 702.42 G35D 701.95 G35S 701.92 G41M 702.99 G41D 701.17 G41S 701.68 R03S 701.93 G03M 702.01 G33S 706.64 G33D 705.82 G38S 702.92 G36S 707.45 G30 707.74 R42S 709.06 G48D 710.60 R28D damaged G26S 711.92 G26D 711.75 R25D 712.86 R24D 713.49 G23D 714.08 G29D 716.76 G29S 715.45 G09D 720.11 G09M 719.78 R05S dry G20D 722.39 G13S 719.17 G15D 718.74 R11S 717.76 G11D 717.94 R22S *731.80 G22D 718.42

MW-21-04 NA MW-19-04 NA MW-15-04 NA MW-18-04 NA MW-25-04 NA MW-17-04 NA MW-23-04 NA MW-16S-04 NA MW-16D-04 NA

NOTES:

1. CONTOUR INTERVAL = 5 FEET
2. SAMPLE DATES = 11/17/2011.
3. (*) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
5. IN THE CASE OF NESTED WELLS THE GROUNDWATER ELEVATIONS FROM SHALLOW WELLS WERE USED IN THE COMPILATION OF POTENTIOMETRIC CONTOURS.
6. POTENTIOMETRIC CONTOURS AS SHOWN ASSUME CONTINUOUS GEOLOGICAL CONDITIONS AND DO NOT ACCOUNT FOR LINER AND SIDEWALLS EMPLACED FOR DEVELOPMENT OF THE NORTH EXPANSION UNIT.

N

300 0 300 600 1200

SCALE: IN FEET

NO.	DATE	REVISIONS DESCRIPTION	BY

ANDREWS ENGINEERING, INC.
3300 Ginger Creek Drive, Springfield, IL 62711-7233
Tel (217) 787-2334 Fax (217) 787-9495
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO
Professional Design Engineering and Land Surveying Firm #184-001541

APPROVED BY: JLR | DESIGNED BY: | DRAWN BY: MPN

POTENTIOMETRIC SURFACE MAP
4TH QUARTER 2011
PLANS PREPARED FOR
WINNEBAGO LANDFILL
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: January 2012
PROJECT ID: 90-114
SHEET NUMBER: 4Q11

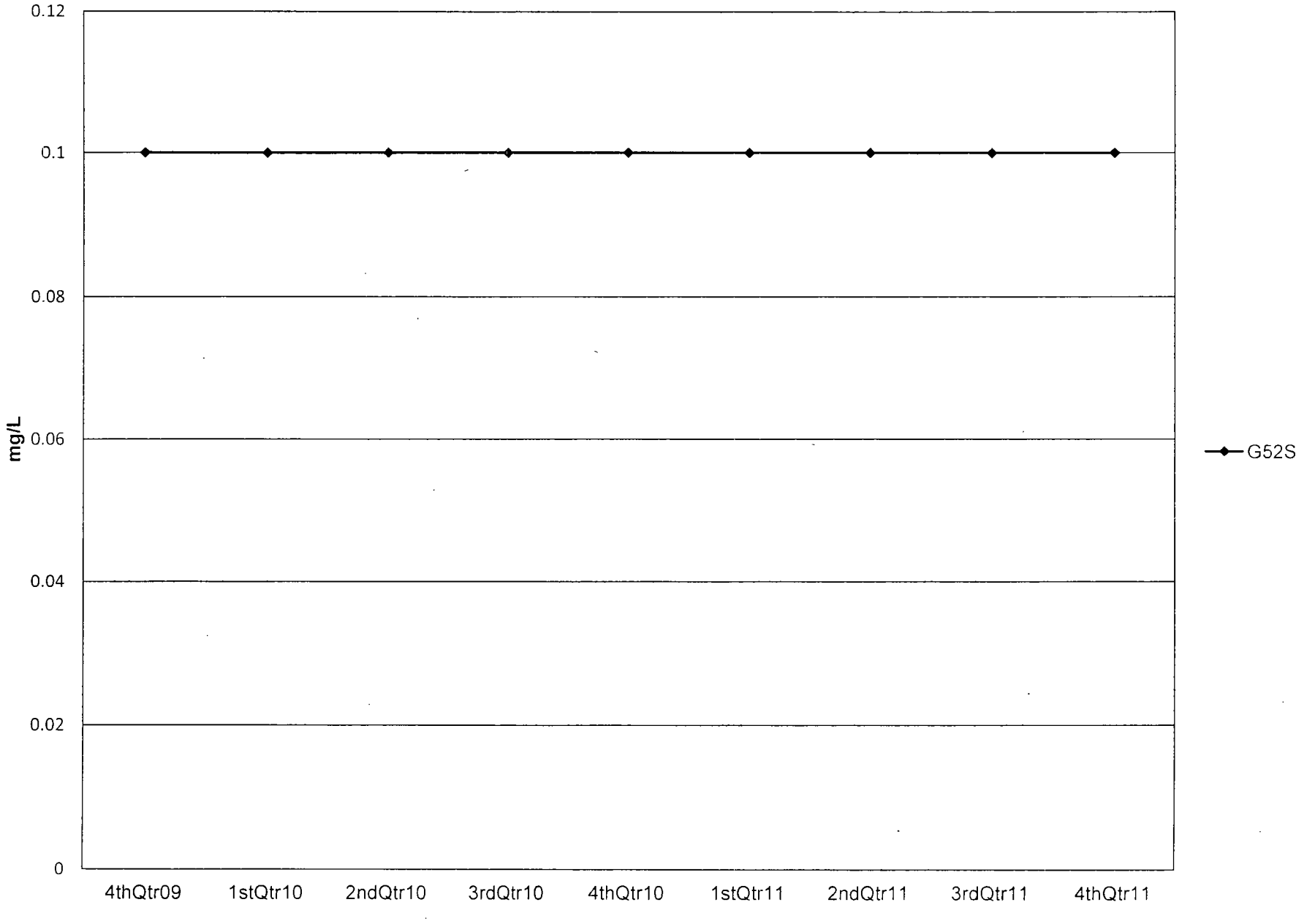
J:\1990\90-114\DWG\Annual GW Flow maps\2011 PMAPS\4q11.dwg Tab: Layout1 Last Saved: January 13, 2012, by William Ulewicz Plotted: Wednesday, February 01, 2012 1:47:54 PM

APPENDIX C

Graphical Trend Analyses

Winnebago Landfill
Northern Unit

Dissolved Ammonia



Andrews Engineering, Inc.

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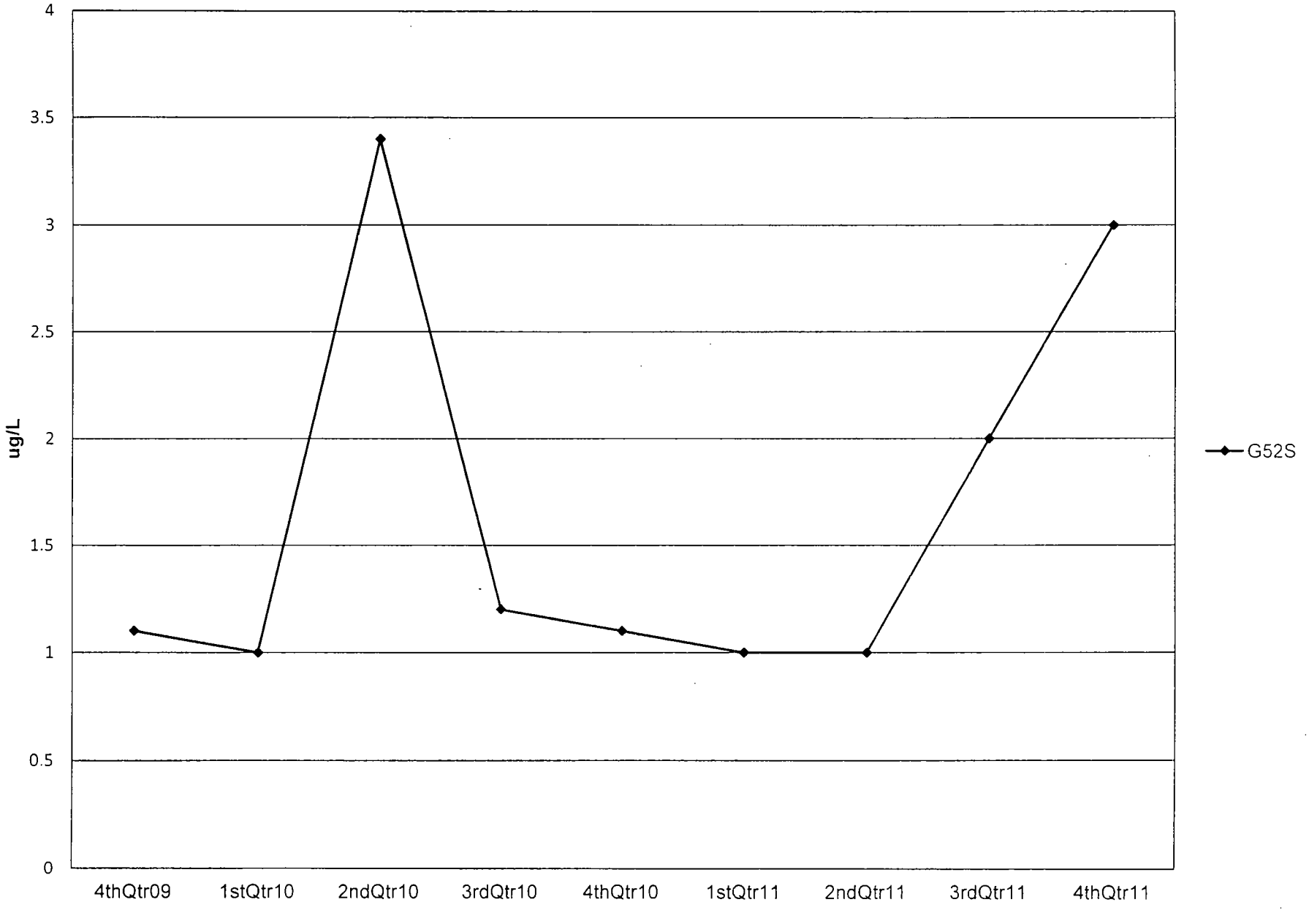
Winnebago Landfill
Northern Unit

Dissolved Arsenic



Andrews Engineering, Inc.

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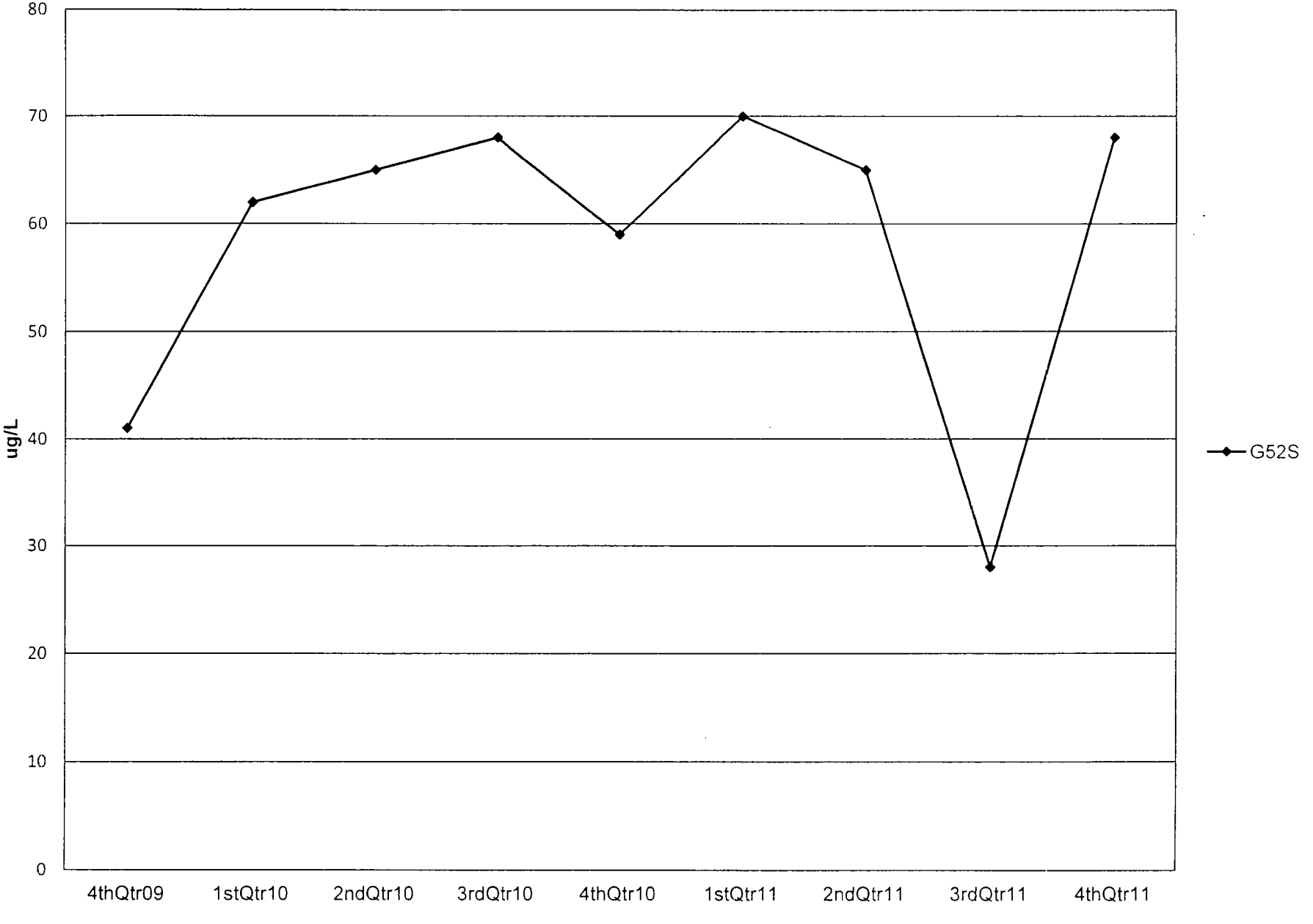
Arsenic, d

Winnebago Landfill
Northern Unit

Dissolved Boron



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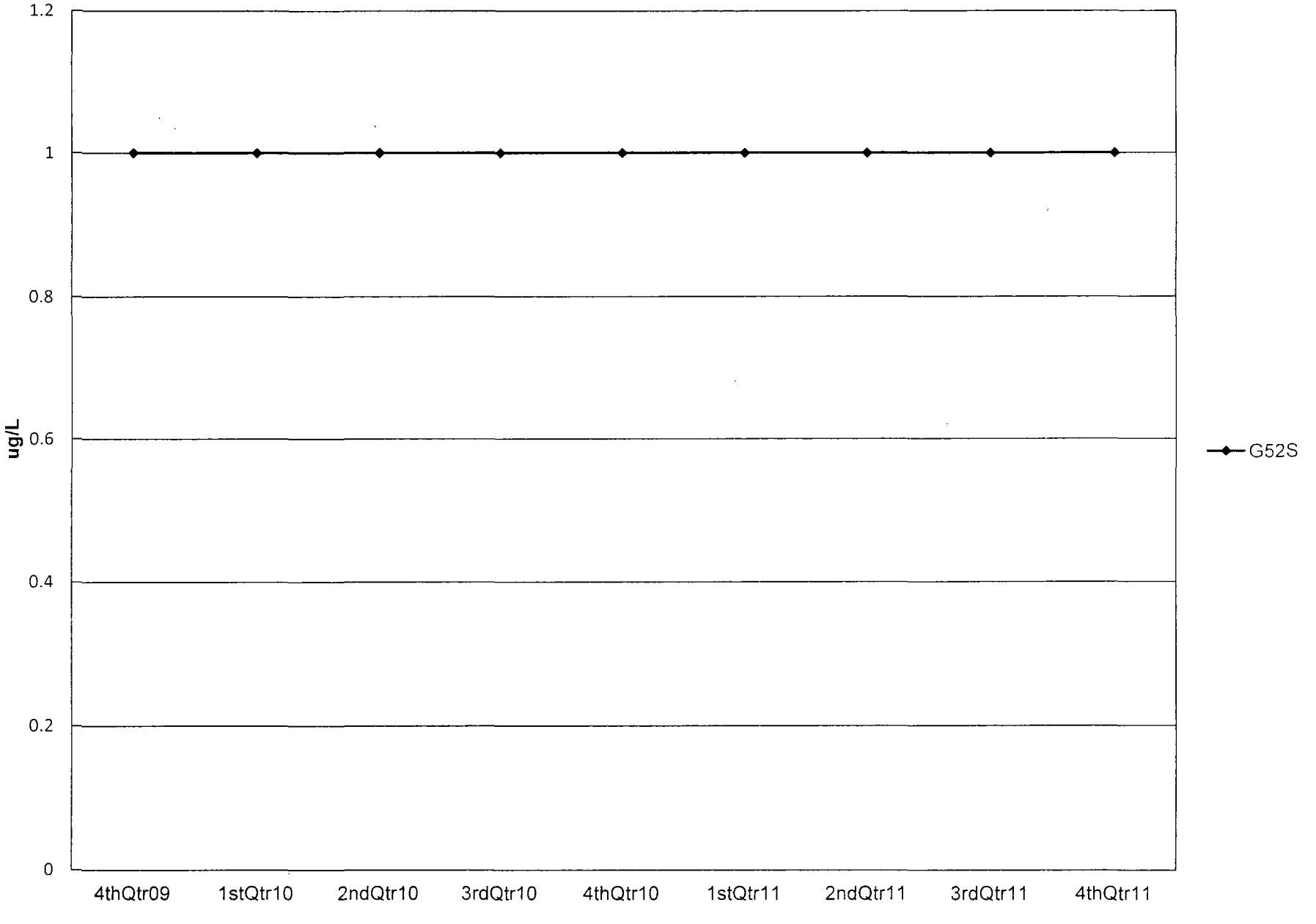
Boron, d

Winnebago Landfill
Northern Unit

Dissolved Cadmium



Andrews Engineering, Inc.

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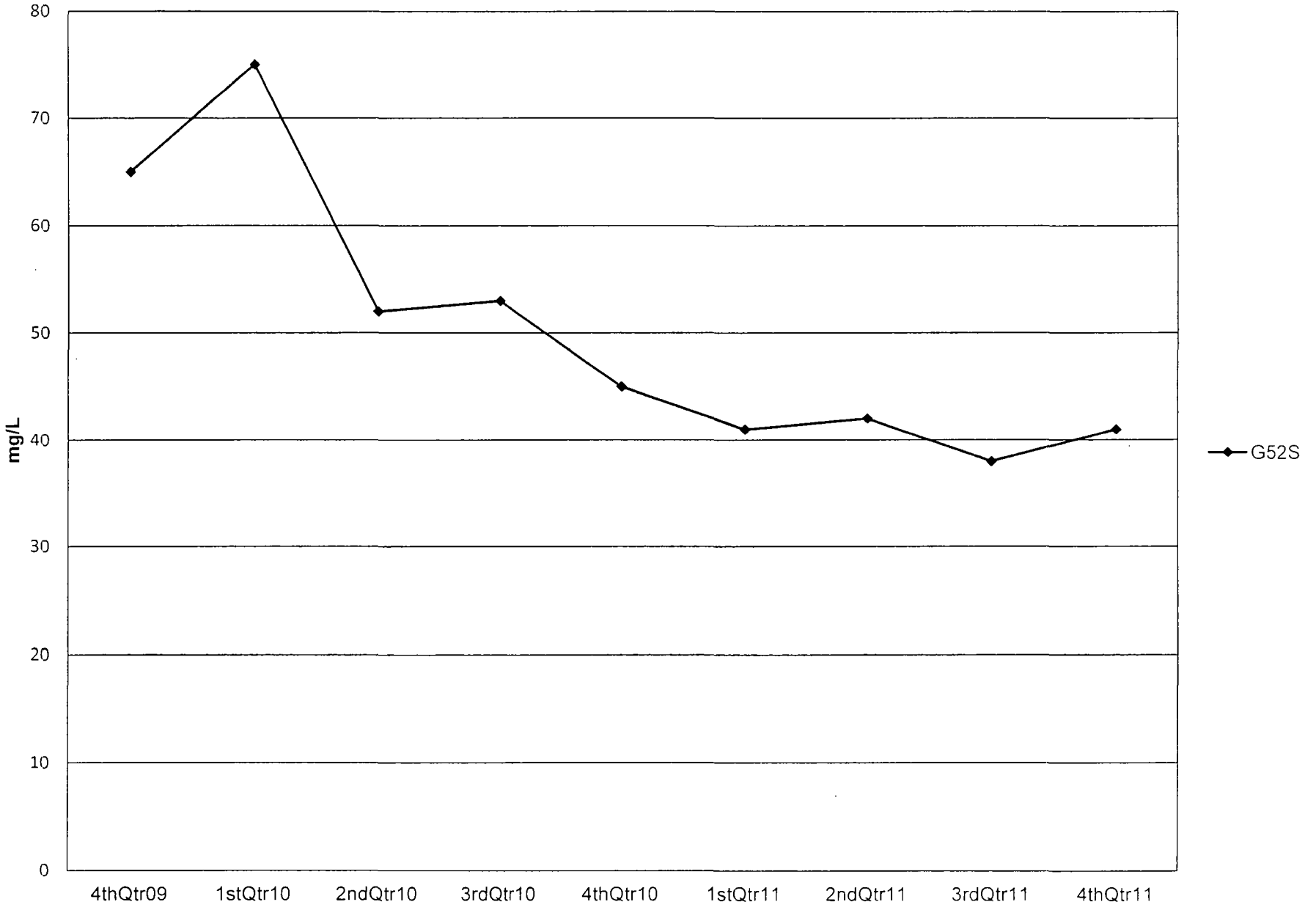
Cadmium, d

Winnebago Landfill
Northern Unit

Dissolved Chloride



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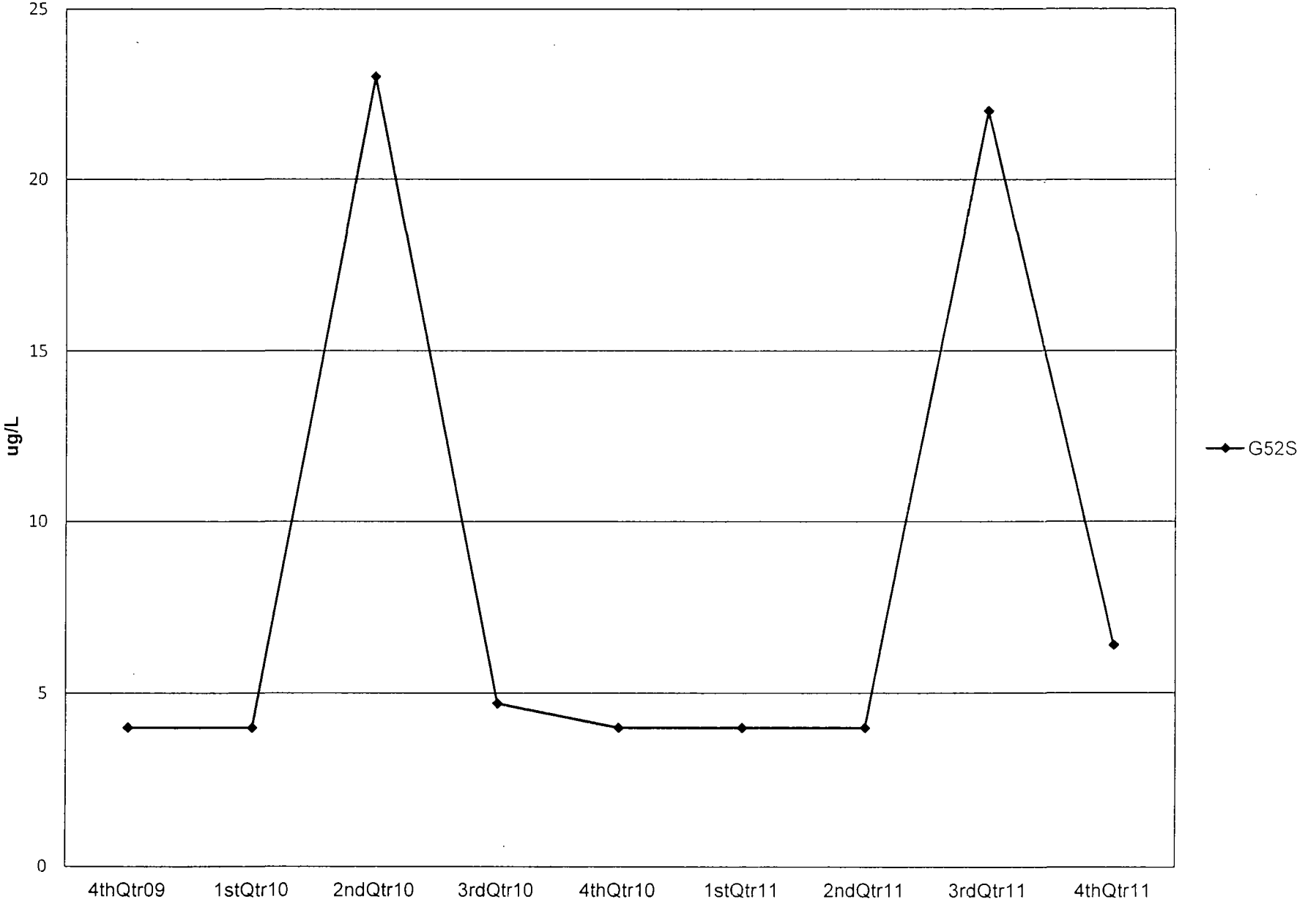
Chloride, d

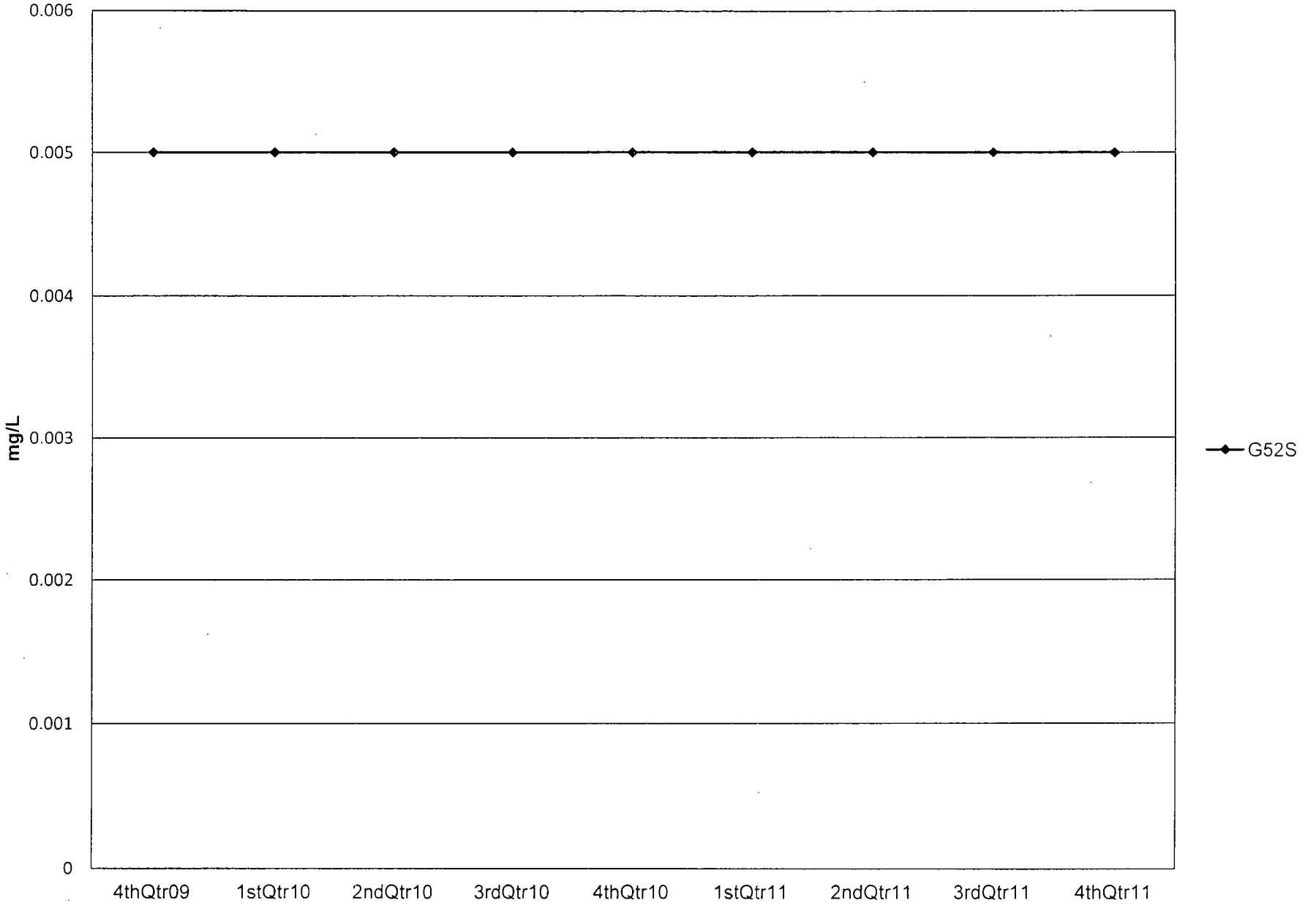
Winnebago Landfill
Northern Unit

Dissolved Chromium



Winnebago Landfill
Northern Unit

Total Cyanide



Andrews Engineering, Inc.

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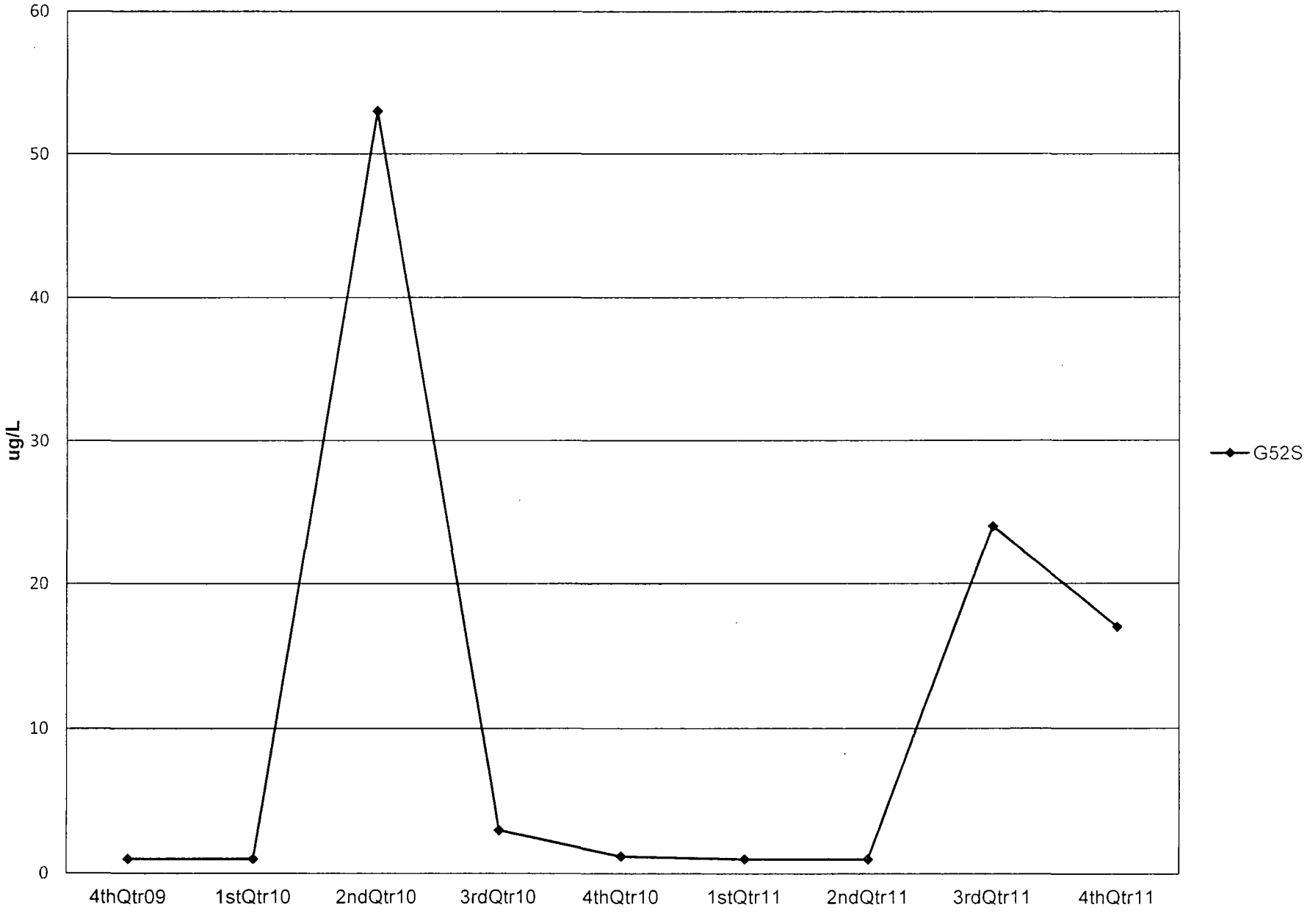
Cyanide

Winnebago Landfill
Northern Unit

Dissolved Lead



Andrews Engineering, Inc.

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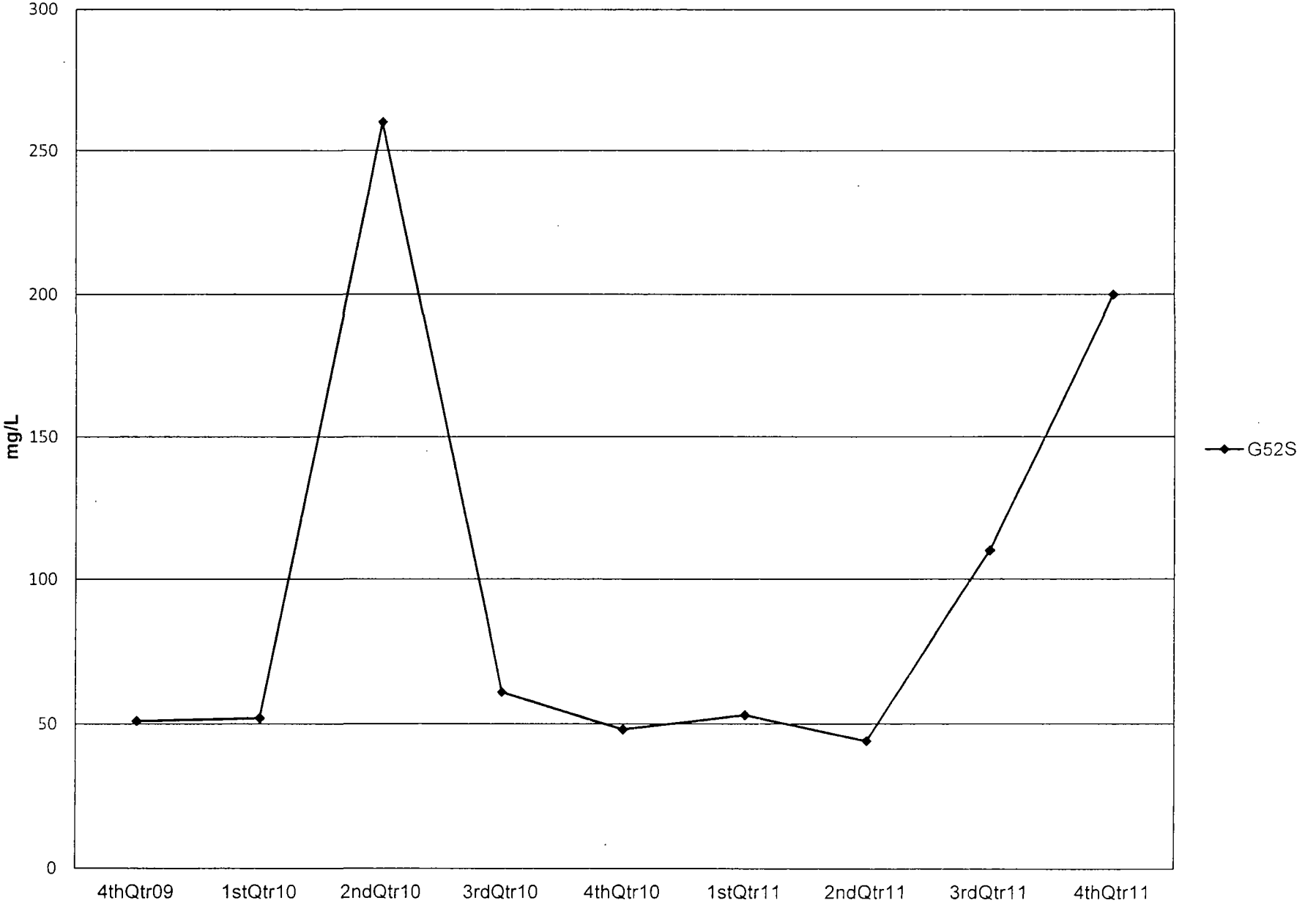
Lead, d

Winnebago Landfill
Northern Unit

Dissolved Magnesium



Andrews Engineering, Inc.

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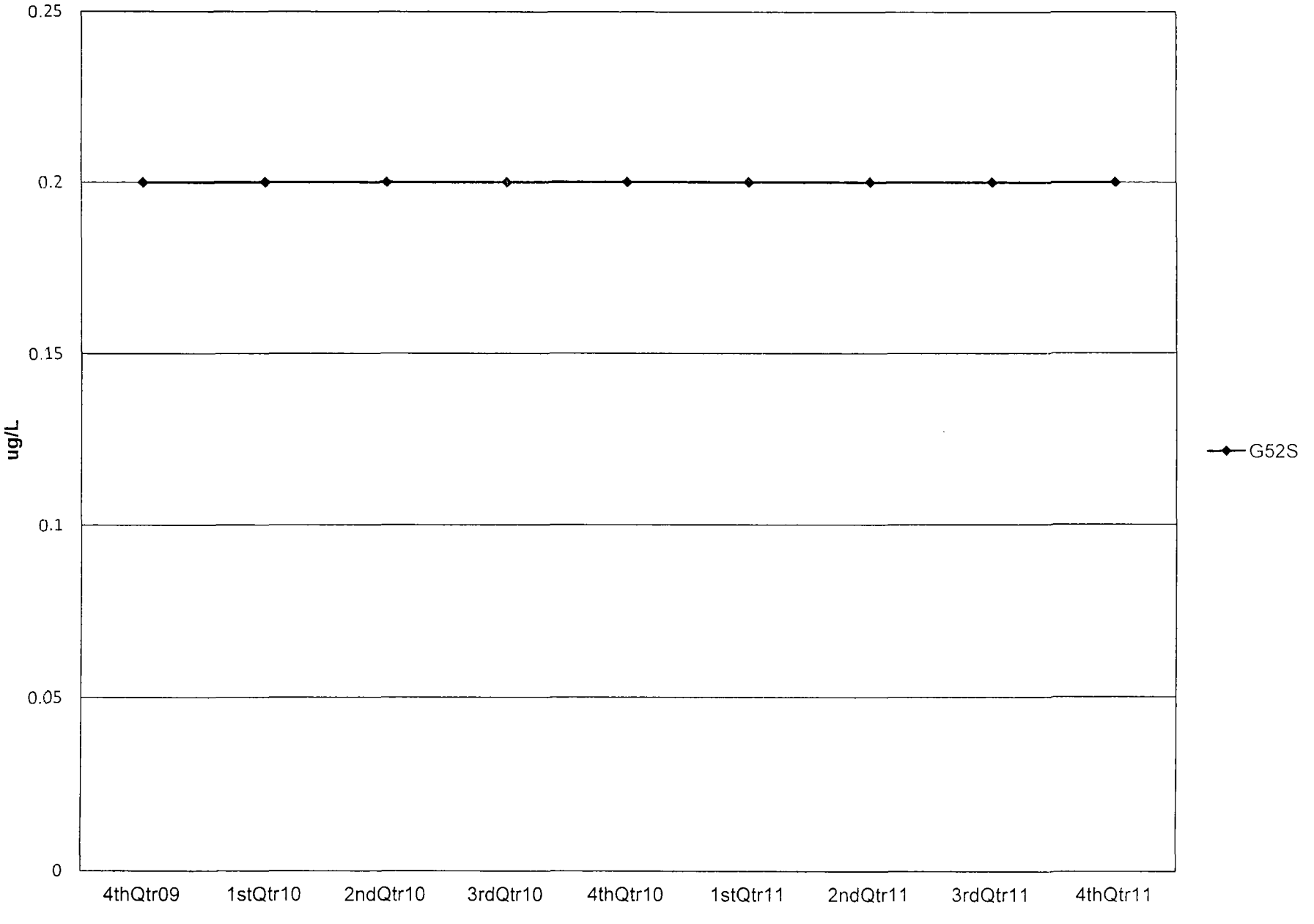
Magnesium, d

Winnebago Landfill
Northern Unit

Dissolved Mercury



Andrews Engineering, Inc.

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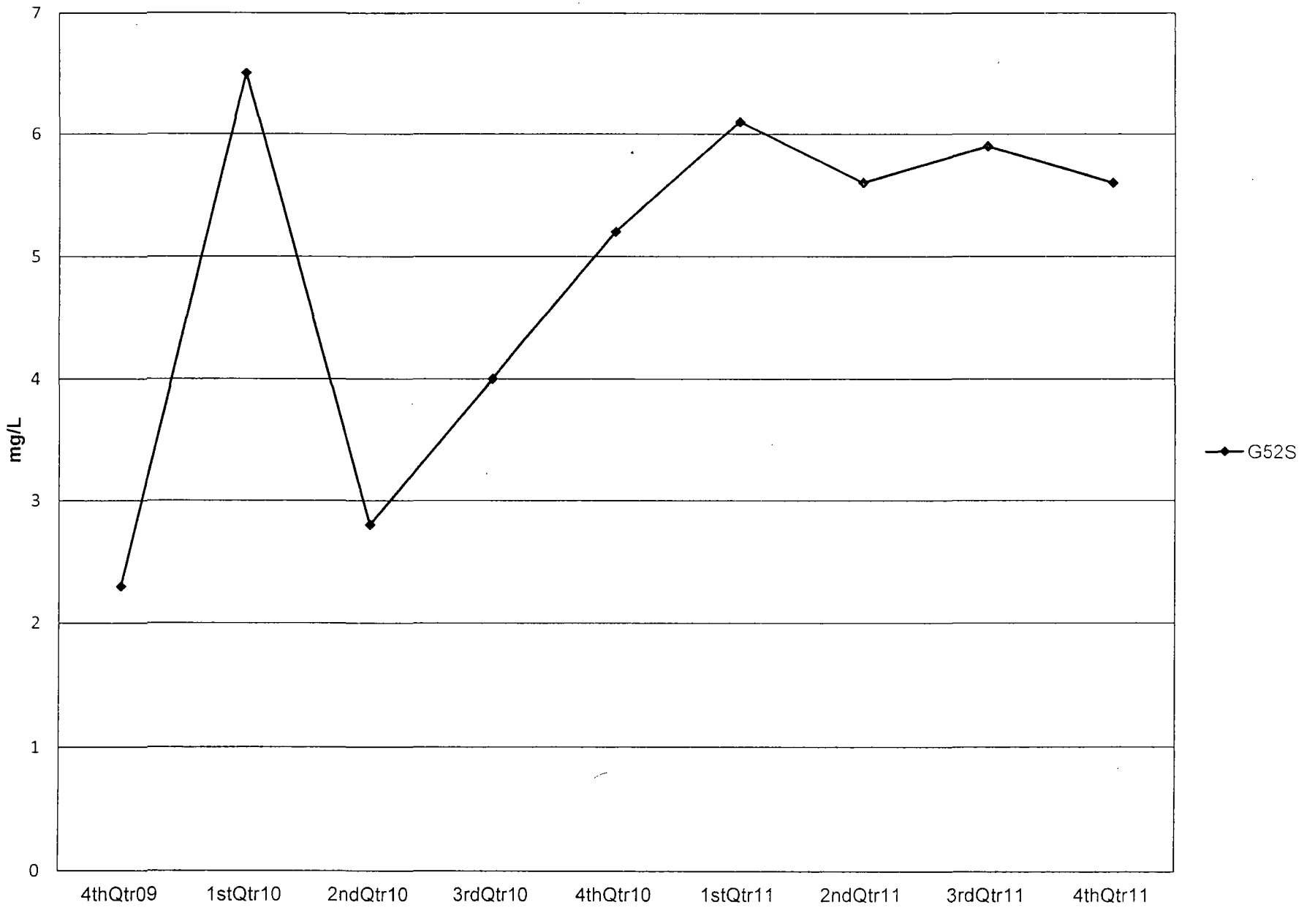
Winnebago Landfill
Northern Unit

Dissolved Nitrate



Andrews Engineering, Inc.

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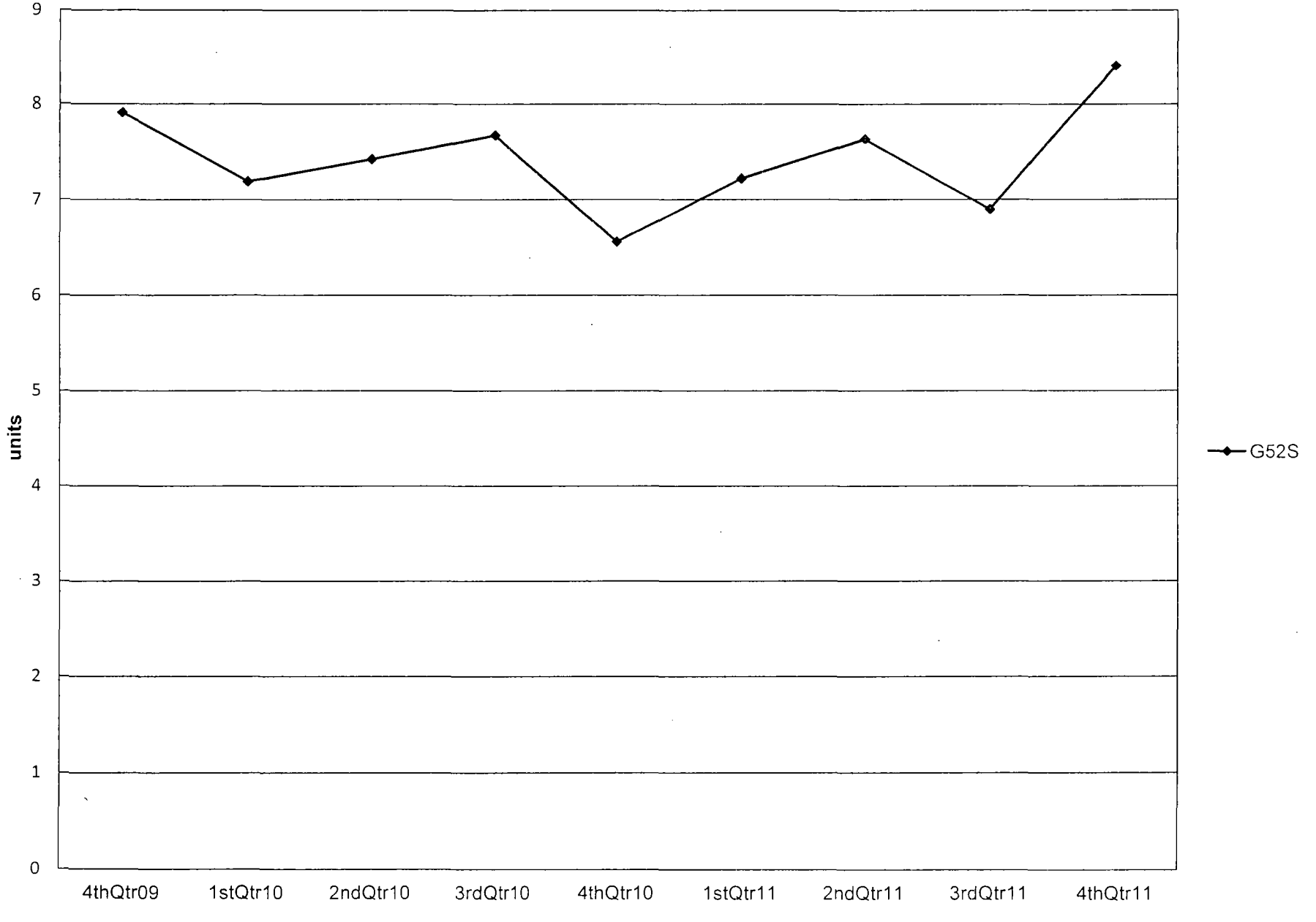
Winnebago Landfill
Northern Unit

pH



Andrews Engineering, Inc.

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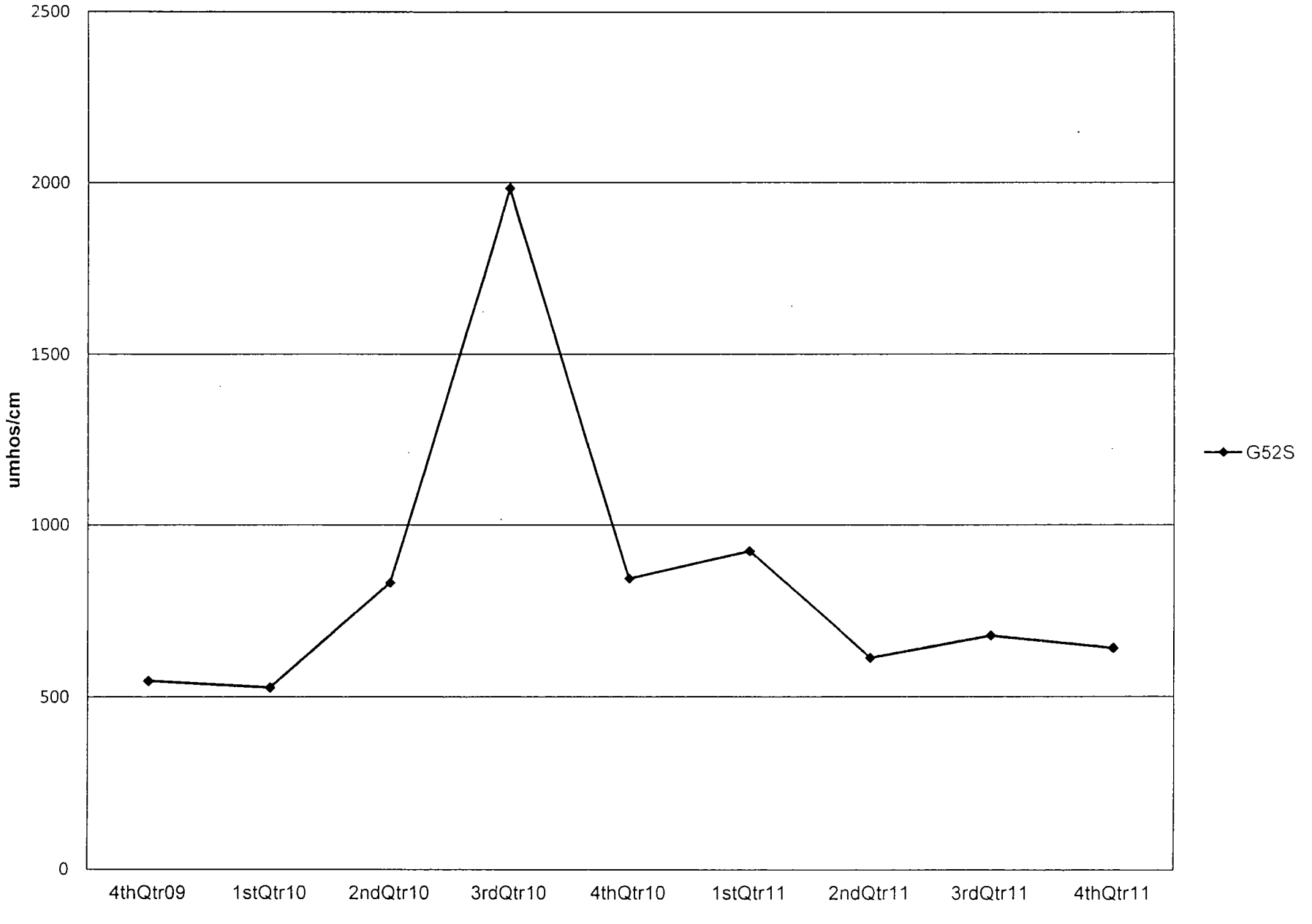
pH

Winnebago Landfill
Northern Unit

Specific Conductance



Andrews Engineering, Inc.

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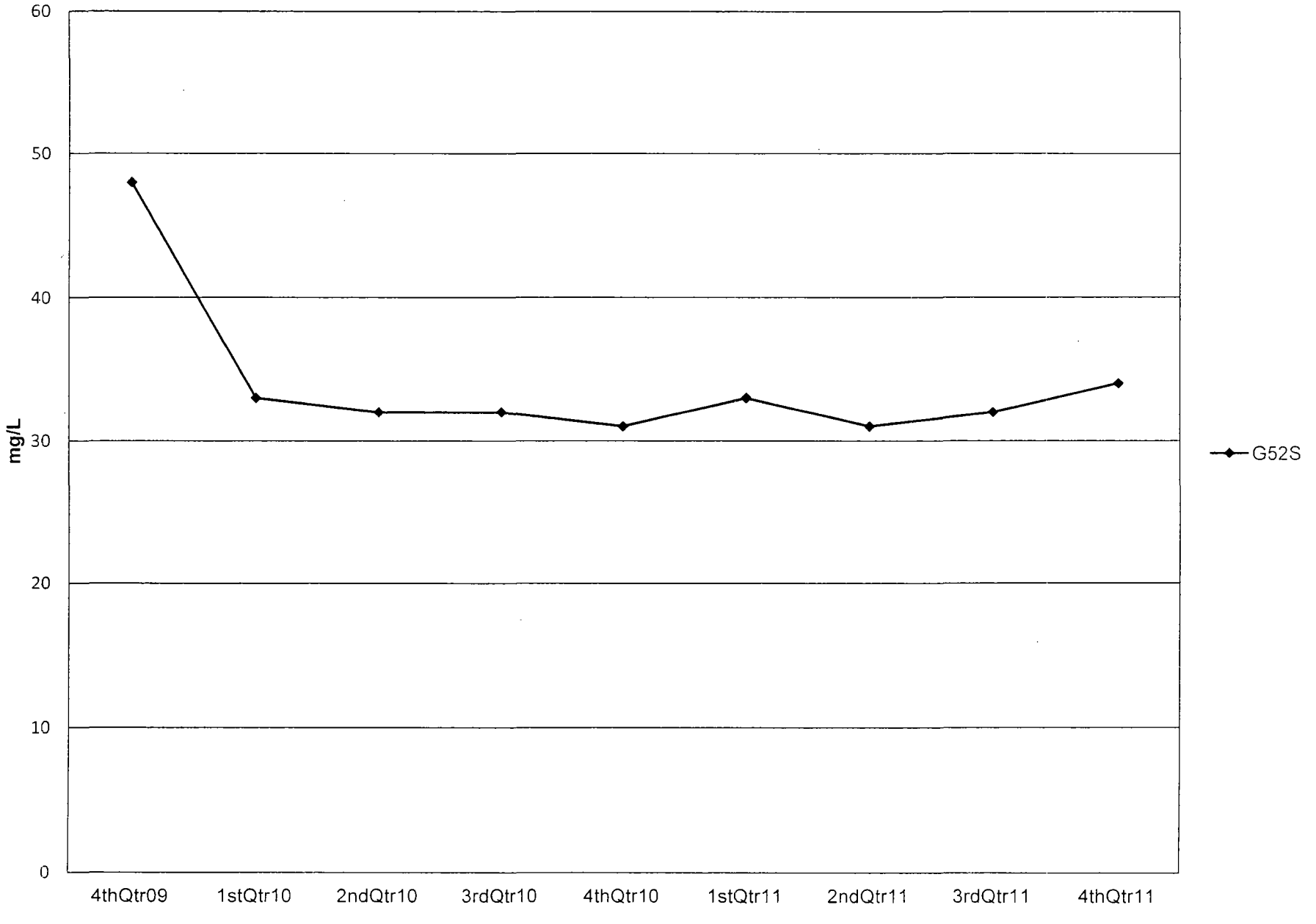
SC

Winnebago Landfill
Northern Unit

Dissolved Sulfate



Andrews Engineering, Inc.

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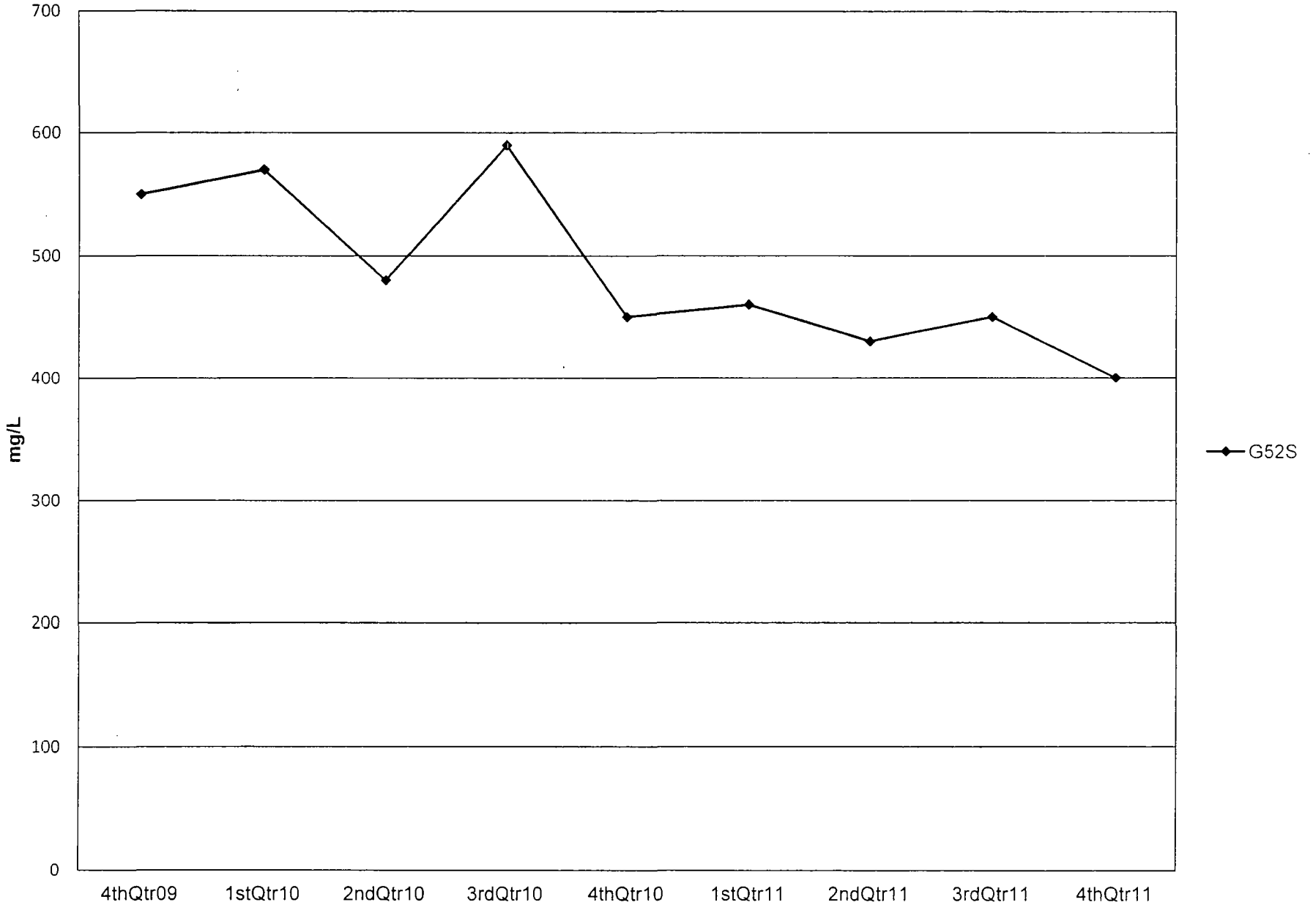
Sulfate, d

Winnebago Landfill
Northern Unit

Total Dissolved Solids



Andrews Engineering, Inc.

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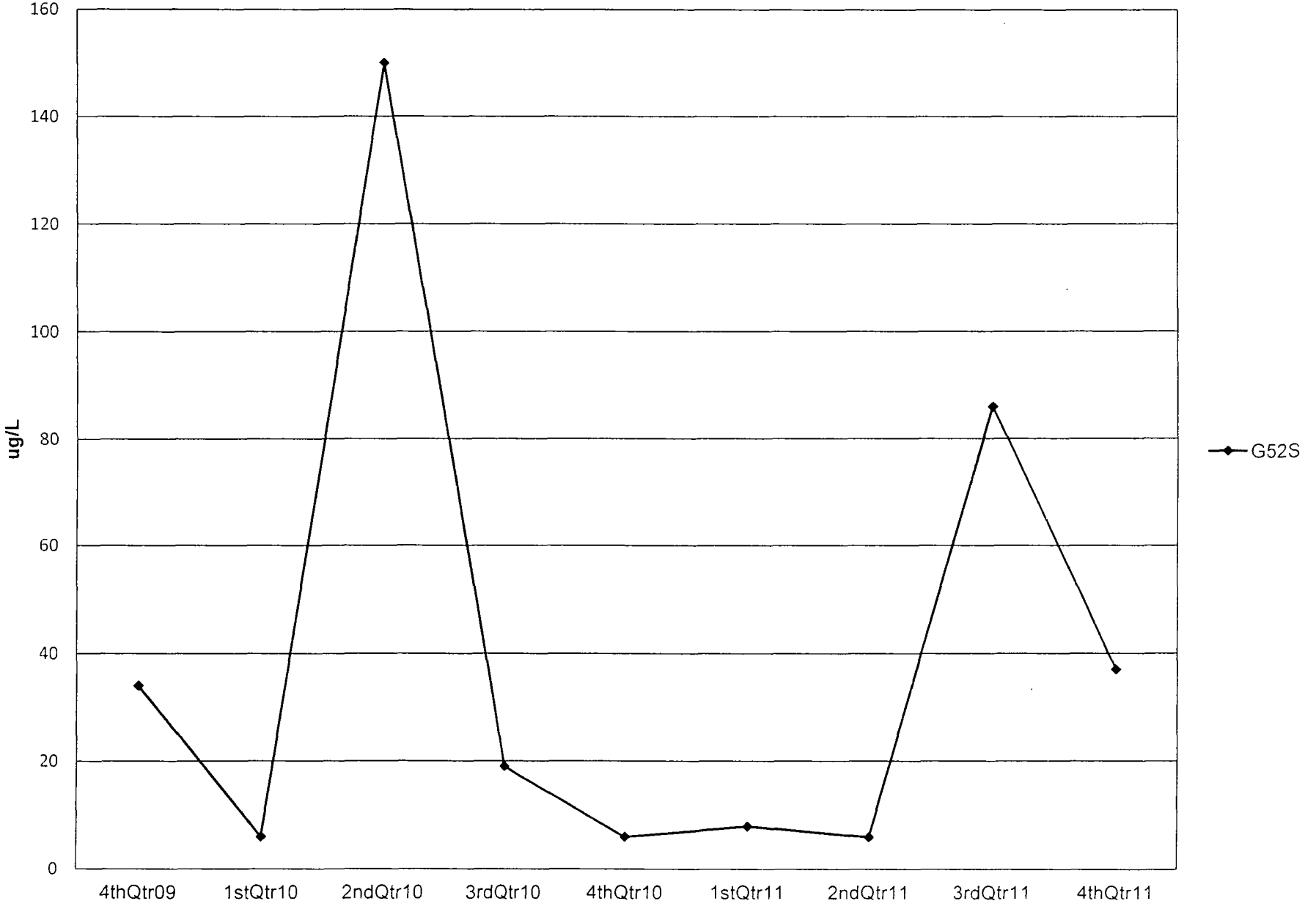
TDS

Winnebago Landfill
Northern Unit

Dissolved Zinc



APPENDIX D

Statistical Method

Statistical Analyses Method

References:

1. 35 Illinois Administrative Code 811.320
2. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance, USEPA, March 2009

Background quality shall be determined using the statistical techniques set forth in 35 IAC 811.320(e) and the facility permit. The data was tested for normality using the Shapiro-Wilk normality test. If the data was found not to follow a normal distribution, a nonparametric statistical method was utilized. The data was then examined for outliers. After the outlier test, the percentages of non-detect values (NDs) were calculated for each parameter to determine the applicable ND treatment method, if any. Upon completion of the treatment of non-detect values, the prediction limit for each parameter was calculated using the mean, standard deviation, and the appropriate t value. The statistical analysis uses a one-tailed test to determine an upper limit of significance. The upper prediction limit is the concentration for the probability that the constituent can be measured without constituting a statistical increase above the background. Any concentration found below this limit is regarded as falling within the normal statistical population.

Statistical Method

The statistical method employs either the 99% or 95% prediction limit in accordance with the facility permit. The prediction limit incorporates the mean, standard deviation, number of samples, and the Student's t value in the calculation to determine general background groundwater quality. An upper prediction limit is calculated for each individual chemical parameter. The well data from the site is evaluated statistically with samples collected during a minimum of four (4) consecutive quarters of background sampling.

Handling of Outliers

Prior to statistical analyses the data set was evaluated for outliers. Outliers are defined as data points that vary significantly from the mean value for that data set. Outliers may represent sampling error, contamination from surface run-off, analytical laboratory error, or anomalous site conditions. Outliers, if not removed from the data set, can erroneously

increase the AGQS and minimize the occurrence of an exceedences related to a release from a waste unit. Once a statistical outlier has been identified, the concentrations are evaluated to determine the cause. If a valid reason has been determined for the outlier, the data point will be removed from the data set. If no specific reason can be documented, the point will considered representative and included in the analysis. Statistical analysis will then be conducted as described below.

Handling of Non-Detects (NDs)

Non-detect values (NDs) were handled according to the percentage of Non-Detects (%ND) present in the background sampling. The %ND was calculated for each parameter from the pooled background data of each well set. The data treatment was done according to the following criteria:

a) For under 0% NDs, no adjustment is made to the values in the data set.

b) For under 15% NDs, the value of one-half (½) the reported Detection Limit (DL) was substituted for the ND value, and the mean and standard deviation were calculated using detected values with the substituted ND values.

c) For 15-50% NDs, Cohen's Adjustment was used to adjust the mean and standard deviation. The adjusted mean and standard deviation was then used to calculate the prediction limit.

d) For over 50% but not 100% NDs, the highest recorded concentration was substituted for the prediction limit.

e) For 100% NDs, the Practical Quantitation Limit (PQL) will be substituted for the ND value. The mean and standard deviation was calculated using the substituted ND values.

Prediction Limit

The statistical procedure was conducted according to the following steps:

1. Calculate arithmetic mean

The arithmetic mean was calculated using the pooled data for each parameter. The arithmetic mean (X_b) was calculated using the following equation:

$$X_b = \frac{X_1 + X_2 + \ldots + X_n}{n}$$

where: X_b = Average background value

X_n = Individual background value for *n* sample

n = Number of background values

2. Calculate standard deviation

The standard deviation was calculated using the pooled data for each parameter. The standard deviation was calculated using the following equation:

$$S_b = \sqrt{\frac{(X_1 - X_b) + (X_2 - X_b) + \ldots + (X_n - X_b)}{n-1}}$$

where: S_b = Population standard deviation
X_n = Individual background value for *n* sample
X_b = Mean (1)
n = Number of background samples

3. Calculate the Upper Prediction Limit

The Upper Prediction Limit was calculated for each parameter using the mean (1), the standard deviation (2), the number of background samples, and the Student's t value. The Student's t value σ, is determined by the facility permit whether it is σ = 0.01 (99% Confidence) or σ = 0.05 (95% Confidence). The Student's t value also varies upon the number of background samples utilized in the calculations. For those parameters with 15% to 50%% NDs, the Cohen Method was utilized to calculate the Prediction Limit. The methodology described in "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Unified Guidance" was used to calculate the Cohen Prediction Limit. The Upper Prediction Limit for the remaining parameters was calculated using the following equation:

$$PL = X_b +\_ S_b \bullet t \bullet \sqrt{1 + \frac{1}{n}}$$

where: PL = Upper Prediction Limit (Upper and Lower for pH)
X_b = Mean (1)
S_b = Standard Deviation (2)
t = Student's t value at 0.01 or 0.05 significance
n = Number of background samples

APPENDIX E

Statistical Calculations

Winnebago Landfill
Northern Unit
Intrawell AGQS Statistics
G52S

Raw Data

Parameter	Units	1Q11	2Q11	3Q11	4Q11
G52S					
Lead, dissolved	ug/L	< 1	< 1	24	17

Outlier Testing

n = Number of Samples; X_{mean} = Mean; SD = Standard Deviation; T_n = Critical Values

$T = (X - X_{mean})/SD$, where X = sample result

Outlier = $T > T_n$

Parameter	Units	1Q11	2Q11	3Q11	4Q11	n	X_{mean}	SD	T_n	1Q11	2Q11	3Q11	4Q11	1Q11	2Q11	3Q11	4Q11
G52S																	
Lead, dissolved	ug/L	< 1	< 1	24	17	4	10.75	11.6154	1.492	-0.839	-0.839	1.141	0.538	--	--	--	--

A highlighted cell indicates an outlier.

ND Analyses

Parameter	Units	1Q11	2Q11	3Q11	4Q11	Number of Samples	Number of ND's	% ND	ND Treatment
G52S									
Lead, dissolved	ug/L	< 1	< 1	24	17	4	2	50.0%	Cohen's ADJ

Cohen's Adjustment

Parameter	Units	1Q11	2Q11	3Q11	4Q11	Number of Samples	Number of NDs	Detection Limit	Detects Mean	Detects Variance	h	γ	λ	Corrected Mean	Corrected Std Dev
G52S															
Lead, dissolved	ug/L	< 1	< 1	24	17	4	2	1	20.50	24.50	0.50	0.064	0.8586	3.7573	18.7345

Tolerance Limit = $x + st[1+(1/n)]^{1/2}$
Confidence Level = 99%

Prediction Limits

Parameter	Units	1Q11	2Q11	3Q11	4Q11	ND Treatment	Mean	Standard Deviation	Number of Samples	T Value	Prediction Limit
G52S											
Lead, dissolved	ug/L	< 1	< 1	24	17	Cohen's ADJ	3.76	18.7345	4	4.5407	98.87